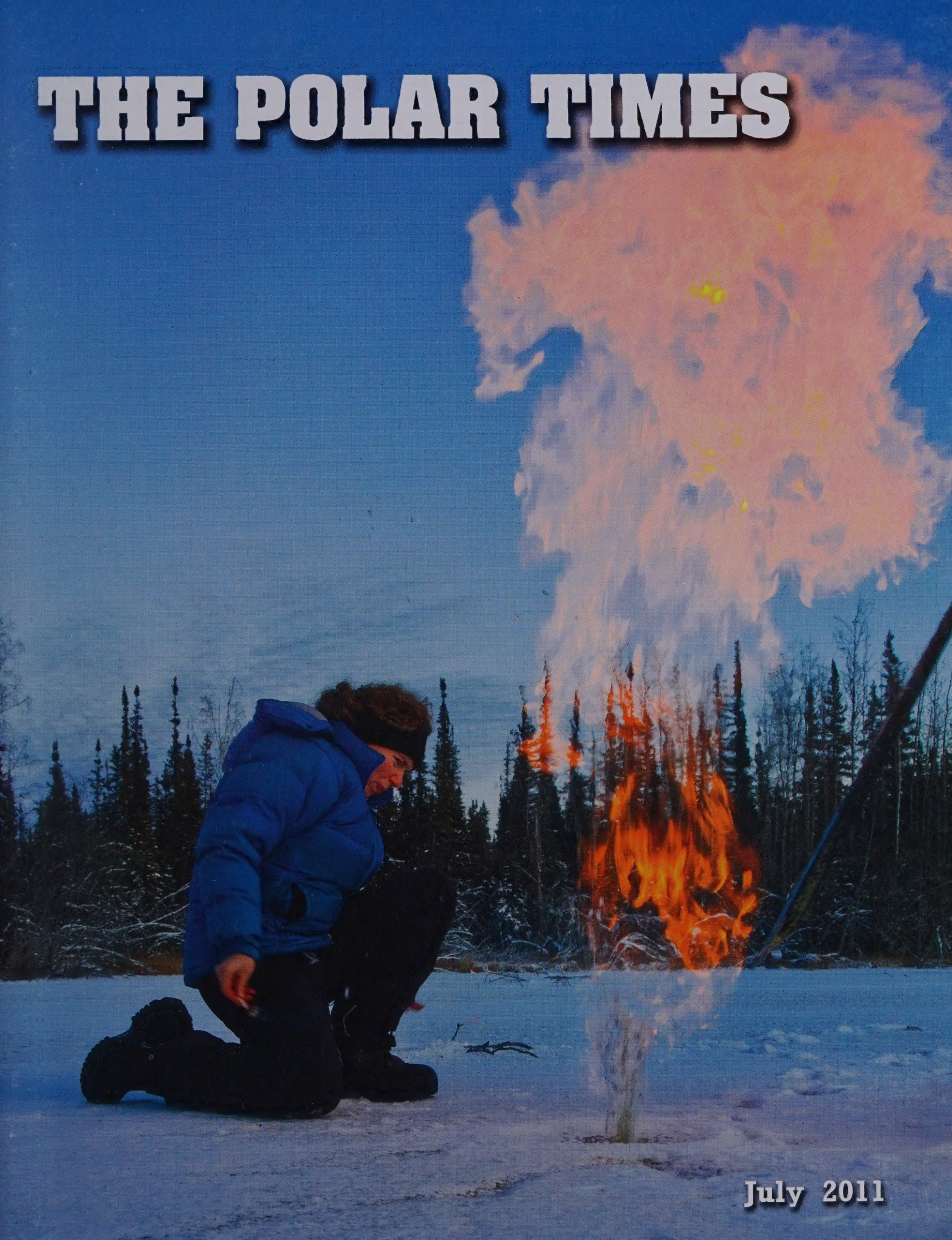
THE POLAR TIMES



July 2011

President's Message

Fellow members of The American Polar Society, in this issue, it is my pleasure to report the progress our officers, governors and I have made to date with regard to increasing APS presence on the Internet, preparations toward celebration of our 75th Anniversary with a world-class international symposium entitled "The Polar Regions in the 21st Century: Globalization, Climate Change, and Geopolitics," and a very special Anniversary issue of *The Polar Times*.

I am pleased to report that the American Polar Society now has a beautiful new web site at **www.americanpolarsociety.com** (also www.americanpolarsociety.org) and is well established on Facebook. Both have helped considerably in not only making APS better known throughout North America and the world at large, but have also helped us to gain many new members, particularly in the "Life Membership" category. We have also been working very hard to rebuild a development team, essentially from scratch, in order to attract as members the myriad corporations and institutions who have supported exploration and field science in the Arctic and Antarctic in the almost eight decades since APS's founding. In this regard, you will note a change among APS's governors as we work toward attracting those who will, as a team, actively assist us in achieving the important goals of increasing our numbers, visibility, relevance and financial security, which I outlined in my first message to you earlier this year. Notable among our newest governors are Dr. Don Walsh, Dr. Sylvia Earle and Will Steger.

Plans are now solidly under way for holding APS's international symposium at a most suitable and exciting location within the U.S. as early as April 2012 and to publication of the 75th Anniversary issue of *The Polar Times* late this coming fall. Much now depends, however, upon favorable decisions by the major corporations and foundations to which we have extended invitations to sponsor these two significant efforts. Our efforts will, in addition, be helped to a considerable extent by your much appreciated support, whether initial or continued, as your officers and governors work hard to bring these two efforts to fruition. I know you will be very pleased with the result!

I look forward to communicating and, hopefully, meeting each of you in the months to come!

Alfred S. McLaren

President, American Polar Society

Changing of the Guard

by Cliff Bekkedahl, Managing Editor

Kevin Bjella has submitted his resignation as secretary of the American Polar Society.

In his words, "Unfortunately and regretfully, at this time I am unable to participate due to other commitments in my life. The commitments are good ones but, nonetheless, they prevent me from being an active contributor, and APS needs a secretary who can stay on top of emerging issues and tasks. A replacement has been found …."

Kevin has served us with distinction in this capacity for over six years now and guided the organization through two elections of officers, innumerable changes in the composition of our Board of Governors and other important organizational matters including reconfirmation of our IRS status as a 501(C)3 entity.

The secretary position may not afford the glamour or panache of, say, the Captain of the APS Sky Diving Team or as leader of the Society's All-Penguin Marching Band. Indeed, it is almost exclusively a behind-the-scenes and unsung role. Even so, on the countless occasions over the past six years, whenever the President has reached out to the Officers of APS for advice, counsel and support, Kevin has been a first responder, offering sound recommendations as well as volunteering his time and energies to accomplishing the task at hand. He will be missed as secretary, but he is not leaving the organization, and perhaps, down the road, he will once again answer the call. Thank you, Kevin.

Welcome, Andy Cameron

The good news! We are proud and pleased to announce that Andrew "Andy" Cameron has agreed to accept the position of secretary of the American Polar Society. Many members know Andy and also know that he is living proof of the adage, "If you want to get

Continued on page 31

About Our Front Cover

Katey Walter Anthony sets a methane bubble ablaze on a frozen lake near Fairbanks, Alaska
❑ Photo by Todd Paris, UAF Marketing & Communications, © Katey Walter Anthony

American Polar Society

The American Polar Society was founded Nov. 29, 1934, to band together all persons interested in polar exploration. Regular membership dues are $25 a year ($35, foreign) and entitle members to receive *The Polar Times* twice a year. The American Polar Society is classified as a tax exempt organization under Sec 501(C)3 of the IRS Code. For more information about the American Polar Society, contact Andrew Cameron, APS Secretary, at andycameron@earthlink.net.

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Antarctic Peninsula Journal

by Sheldon Bart

The landmarks had slipped away. We were surrounded by sheer whiteness (see photo at right). Endless white joined seamlessly to an overcast sky. A whiteness without direction. A whiteness that could swallow New York.

Dr. Bulat Mavlyudov drew a shovel from his backpack and quickly excavated a rectangular hole in the snow about a yard deep. A tall, pleasant man, he wore an orange shell, the better to be seen against a white background. Our Antarctic summer school watched as Bulat pointed out the layers of snow that had been clearly exposed. He filled a cylinder with snow, weighed it with a portable scale and jotted down the reading, meanwhile answering questions from the American and Russian professors and graduate students who had gathered around him.

Photo by Sheldon Bart

Two of the scientists in the party, Dr. Ning Zeng, an associate professor at the University of Maryland, and Dr. Jay Gregg, who recently completed his PhD at that facility, were sponsored by my organization, Wilderness Research Foundation. Our group of 13 had assembled in Punta Arenas, Chile, and flew to King George Island in a C-130 Hercules transport operated by the Uruguayan Air Force. King George is the largest of the South Shetland Islands, situated just off the Antarctic Peninsula. Approximately 90 percent of King George Island is glaciated. We landed on Fildes Peninsula, a stubby limb of exposed, broken tableland on the southwest tip of the island, and were billeted at Russia's Bellingshausen science station.

The southern foot of the ice dome that covers the island is some two miles north of Bellingshausen, which is located on the east coast of Fildes Peninsula. The perimeter of the engulfing whiteness we had ascended, trekking through snow up to our shins, has receded inland approximately 20 yards in the past 20 years, Bulat told us. A glaciologist, he traverses the ice cap alone a couple of times each week to compile data. The summer school, a joint venture of the University of Alaska and Moscow's Obukhov Institute of Atmospheric Physics, was organized to provide young scientists with an on-site orientation from Bulat and other senior investigators working on King George Island. The receding icecap, however, had lured Ning, Jay and Wilderness Research Foundation to the Antarctic Peninsula. For my scientists, it provided an opportunity to seek physical evidence for a new theory of the mechanisms of climate change. For Wilderness Research Foundation, it meant a chance to demonstrate a new model of scientific exploration beyond the limited regime of government funding.

Photo by Sheldon Bart

LI-COR Automated Soil CO-2 Flux System in the field.

Bellingshausen Station occupies a coastal stretch of muddy, snowy ground riddled with tractor tracks and surrounded on three sides by undulating elevations, dark and dappled with snow. The fourth side is a pebbly beach, where a small contingent of Gentoo penguins can usually be found attending to penguin business. The station is a large compound consisting of numerous small buildings. There is an administration building; a combination mess hall and recreation center with pool and Ping-Pong tables, a library and film library; a generator room; a chapel on a hill; and trailer-style dormitory buildings. Our accommodations were on a steep hill near the chapel and a good climb up from the admin building. The buildings were all painted orange — a color Admiral Byrd selected after serious investigation of the most visible hue against a white background. Our visit took place in January. The temperature averaged in the 30s, and a misty overcast lay above the outlying slopes.

LI-COR Biological Sciences of Lincoln, NE, had loaned Ning and Jay an LI-8100 Automated Soil CO_2 Flux System — a sensitive carbon-detecting instrument. I watched them squatting on the living room floor of our hilltop hut, unpacking the device. Ning, a soft-spoken professor of atmospheric science, has arrived without fanfare at an intriguing insight about carbon dioxide build-up and glacial cycles. When glaciers advance, they advance over trees, soil and vegetation, all of which are compounded of carbon. The glaciers compress and bury the organic carbon as they advance.

"No one asks what happens to the buried carbon," Ning said. He suspects that when the glaciers recede and the buried

PHOTO BY SHELDON BART

Bellingshausen Station (Russia) and Frei Station (Chile) in distance

carbon is exposed it dissipates back into the atmosphere, accounting for a significant part of the increase in carbon dioxide that currently obtains. A well set-up fellow with short, bristly hair, he suddenly became expressive. "I submitted a paper to the National Science Foundation on my theory. Basically, I was ignored. But if I can find physical evidence...."

Less than 20 percent of the scientists who apply to NSF are actually funded. That leaves a lot of science derailed. Our expedition to King George Island as members of the international summer school set the stage for Wilderness Research Foundation's pilot project.

From a distance, the ice cap looks like an immense white cloud sitting on the dark ground. The closer you approach, the more it resembles an ordinary snow-covered hill. But when you reach the bottom of that "hill" and brush some of the snow away with the toe of your boot, you see ice underneath. A jagged moraine runs across the slope at mezzanine level like a brown belt running east to west. A moraine is a ridge of sediment collected by a glacier in its travels. Ning and Jay had noted various loamy sites below the moraine from which the glacier had steadily retreated. It was feasible at these sites to prospect for ancient buried carbon. Accordingly, we headed along the western sweep of the moraine, accompanied by two members of the summer school group who were also conducting research in the field: Dr. Les Werner of the University of Wisconsin, and his research assistant, Christopher Johnson, a graduate student at Michigan Technological University. Les, a soil specialist, studies the evolution of microorganisms in glacial environments.

There were no obvious signs of carbon at the western moraine site. The LI-COR machine, carried into the field, disassembled, in our backpacks and assembled at the moraine, detected only a negligible carbon signature in the muddy ground.

From a distance, the ice cap looks like an immense white cloud sitting on the dark ground.

Color matters in the Antarctic. Streams of melt water and rain water spill over on some parts of the trail, and you can tramp through them, the water coming up to your ankles. You notice pools of blue water in various spots, and you learn not to walk on them. Blue is the color of young ice that is not yet firm. It will give way under you, and you'll sink. Within a day or so, the blue turns to gray. The ice has now firmed up enough so that you can walk on it without sinking.

Observing these signs, we hiked a couple of days later to a site along the eastern moraine. Again, the LI-COR CO_2 Flux System was separated into its components and carried in our backpacks. The trail threaded through a narrow, rocky aisle between a wall of snow at the base of the ice dome and the lapping waves of Maxwell Bay at the eastern shore of Fildes Peninsula. We eventually reached a cove where, below the eastern moraine, Ning observed an area of reddish-brown, crumb-like tufts—dead moss, an obvious sign of carbon. The LI-COR machine was assembled and engaged, and at length a strong signal registered of carbon in the soil.

With the fold-out spoon of a Swiss knife, Ning scooped hunks of gook out of the mud and filled numerous plastic bags with the samples. He carefully labeled each bag. Every pocket of his windbreaker bulged with these prizes when we loaded our backpacks and started out under the weight of them for Bellingshausen.

Plastic bags filled with gunk. We had gotten what we came for. The samples will be subjected to laboratory analysis and hopefully tell us something about the buried carbon theory.

Meanwhile, a howling storm struck King George Island. A window of opportunity opened a day later as the storm pushed the overcast out to sea and sunny skies prevailed. Multiple flights were therefore scheduled, and the group departed on the last flight of the day of a C-130 Hercules transport operated by the Chilean Air Force.

While the summer school was in session at Bellingshausen Station, lectures were held each night in a spacious conference room at the rear of the administration building. Seven professors and four graduate students made interesting presentations on such subjects as permafrost, glaciology and global climate models.

Before we left, I asked Bulat, the glacier man, what, beyond the science, he feels and reflects on when he is alone up on the ice cap. He has limited English. But this is what he told me. "White," he said, looking to one side. "White," he repeated, looking to the other side. "White," he said, turning half around. "Boundless. Especially when fog." Then he paused a moment and added, "Complete freedom."

I knew what he meant. Roald Amundsen would have said the same thing. ❑

Sheldon Bart is president of Wilderness Research Foundation (WRF). For information on WRF please see www.wildernessresearch.org.

In a Changing Antarctica, Some Penguins Thrive as Others Suffer

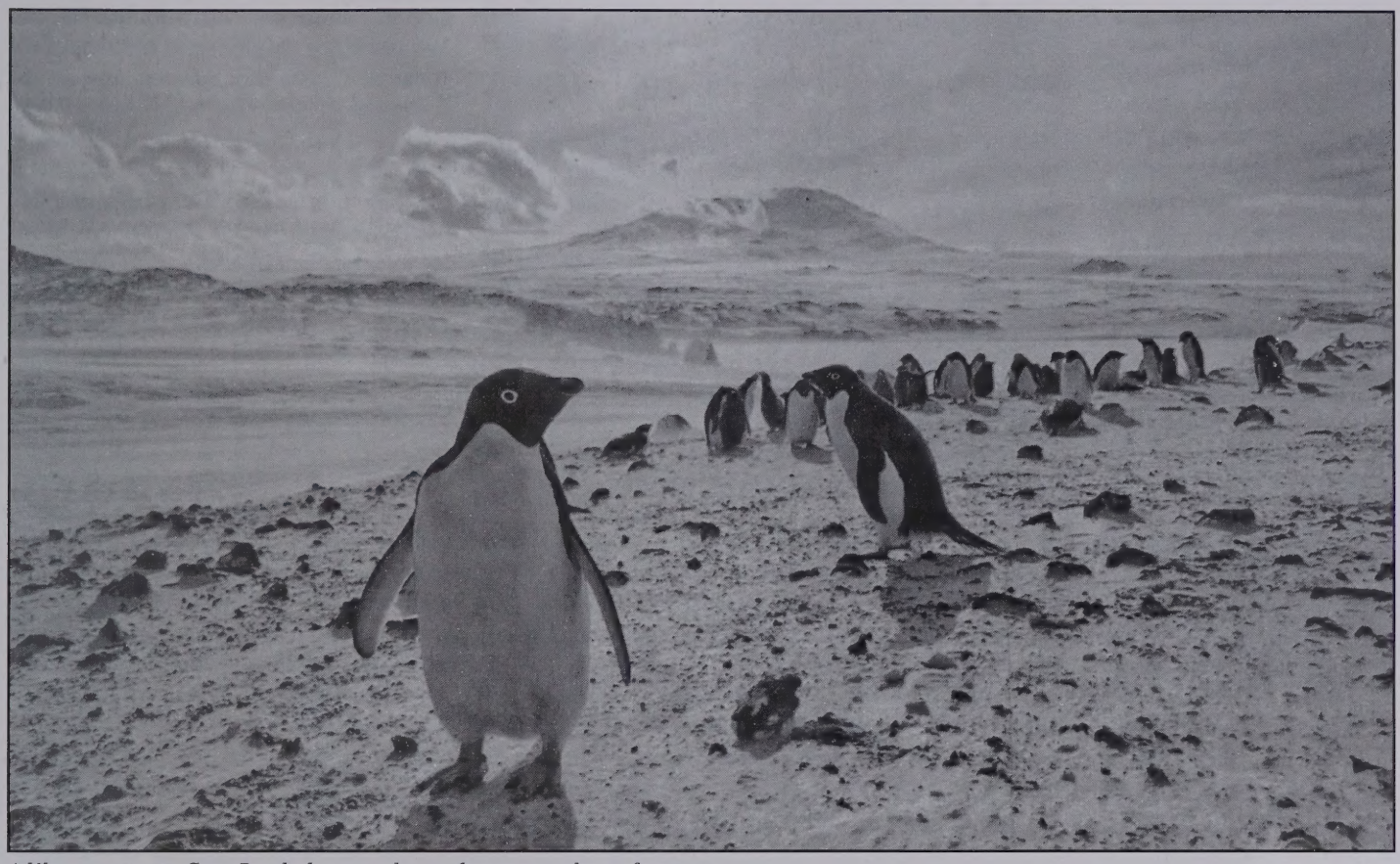

Photo by Andy Isaacson, New York Times

Adélie penguins in Cape Royds, home to the southernmost colony of penguins.

***The New York Times*, 10 May 2011, by Andy Isaacson, ROSS ISLAND, Antarctica** — Cape Royds, home to the southernmost colony of penguins in the world, is a rocky promontory overlaid with dirty ice and the stench of pinkish guano. Beyond the croaking din of chicks pestering parents for regurgitated krill lies the Ross Sea, a southern extension of the Pacific Ocean that harbors more than one-third of the world's Adélie penguin population and a quarter of all emperor penguins, and which may be the last remaining intact marine ecosystem on Earth.

The penguin colony is one of the longest-studied in the world. Data on its resident Adélie penguins was first acquired during the 1907-09 expedition of Ernest Shackleton, the eminent British explorer, whose wooden hut stands preserved nearby.

"This is penguin nirvana," David Ainley, an ecologist with the consulting firm H. T. Harvey and Associates who has been studying Ross Sea penguins for 40 years, said on a morning in January. "This is where you want to be if you're a pack ice penguin."

Of the species that stand to be most affected by global warming, the most obvious are the ones that rely on ice to live. Adélie penguins are a bellwether of climate change, and at the northern fringe of Antarctica; in the Antarctic Peninsula, their colonies have collapsed as an intrusion of warmer seawater shortens the annual winter sea ice season.

In the past three decades, the Adélie population on the peninsula, northeast of the Ross Sea, has fallen by almost 90 percent. The peninsula's only emperor colony is now extinct. The mean winter air temperature of the Western Antarctic Peninsula, one of the most rapidly warming areas on the planet, has risen 10.8 degrees Fahrenheit in the past half-century, delivering more snowfall that buries the rocks the Adélie penguins return to each spring to nest — and favoring penguins that can survive without ice and breed later, like gentoos, whose numbers have surged by 14,000 percent.

The warmer climate on the Antarctic Peninsula has also upended the food chain, killing off the phytoplankton that grow under ice floes and the krill, a staple of the penguin diet, that eat them, by as much as 80 percent, according to a new study published this month in *The Proceedings of the National Academy of Sciences*.

But in the Ross Sea a reverse trend is growing, and Adélie populations are actually thriving. The Cape Royds colony grew more than 10 percent every year, until 2001, when an iceberg roughly the size of Jamaica calved off the Ross Sea ice shelf and forced residents to move 70 kilometers north to find open water. (The iceberg broke up in 2006, and the colony of 1,400 breeding pairs is now recovering robustly.) Across Ross Island, the Adélie colony at Cape Crozier — one of the largest known, with an estimated 230,000 breeding pairs — has increased by about 20 percent.

Climate change has created a paradise

Continued on page 6

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for some pack ice penguin colonies and a purgatory for others, but the long-term fate of all Adélie and emperor penguins seems sealed, as relentless warming eventually pulls their rug of sea ice out from under them. Some scientists attribute the recent sea ice growth in the Ross Sea to the persistent ozone hole, a legacy of the human use of chlorofluorocarbons that cools the upper atmosphere over the continent, increasing the temperature difference with the lower atmosphere and equator, and over the last 30 years has delivered significantly brisker westerly winds in the summer and autumn. The warming of Earth's middle latitudes is having a similar effect, increasing that temperature difference and sending stronger winds that push sea ice off the coast and expose pockets of open water, called polynyas, that give nesting Adélie penguins easier access to food.

Climate models predict that the winds and sea ice will continue to increase in the Ross Sea for the next 30 to 40 years, at which time the region is expected to experience a tipping point, as rising temperatures and the waning effect of the ozone hole, now getting smaller, trans-form the climate into the kind now seen in the Antarctic Peninsula.

Already, that process is under way. The average summer temperature at McMurdo Station, the American research base on Ross Island, has inched up 2.7°F in the past 30 years, records show, more than the global average. Scientists conducting long-term studies of lakes in the McMurdo Dry Valleys, Antarctica's largest ice-free area, report that after a decade of cooling, some lakes in the Taylor Valley are now gaining heat. During this past research season the scientists recorded unprecedented lake levels caused by higher glacial runoff.

On Beaufort Island, north of Rosa Island, glaciers have retreated over the rocky coastline farther than they have in 30,000 years, scientists estimate, a time before the last ice age. The receding ice has opened up more nesting habitat for the resident Adele penguin colony, which has expanded to 55,000 breeding pairs from 40,000 in the last decade.

As the sea ice retreats, researchers expect that Adélie penguins living in the Ross Sea will be forced to shift their range farther south toward the pole. In a study between 2003 and 2005, Dr. Ainley and colleagues from PRBO Conservation Science, Stanford University, NASA and the British Antarctic Survey used geolocation sensor tags to track penguins from Cape Royds and Cape Crozier to better understand their migration patterns. Published last year in the journal *Ecology*, the study revealed how the penguins depart their nesting ground in February, at the end of the austral summer, and head north on foot and ice floes to flee the protracted darkness of the Antarctic winter. They appear to stop on the sea ice about 300 miles from the boundary with open water, where they stay to forage and fatten before doubling back south to their island breeding ahead of the creeping northern night — an 8,000-mile journey.

"Emperor and Adélie penguins have an obligatory association with sea ice," Dr. Ainley said. "As the sea ice goes, these species will go."

The Ross Sea is projected to be the last place on Earth where sea ice will endure. But as the annual winter sea ice boundary retreats farther south, pack ice penguins may ultimately find themselves trapped behind a curtain of polar night for which they have no hardwired strategy.

Indeed, Dr. Ainley speculates, Adélie penguins face possible extinction not merely by a loss of habitat — but by an unshakable fear of darkness. ❑

How Many Penguin Species?

Depending on where you read the number, there are 17 penguin species, but occasionally 18. Taxonomists — who are either 'lumpers' or 'splitters' — don't often agree. But from the photo it is also possible to identify only two, not 17 – the white ones are coming, and the black ones are going! **– attributed to Carl Eklund, noted ornithologist, wintered at Wilkes Station, IGY**

New Zealand Antarctic Researchers Find Historical Depot In Antarctica

***Antarctic New Zealand*, 7 June 2011** — Members of a combined Gateway Antarctica at the University of Canterbury and University of Waikato research team in Antarctica in January 2011 discovered a small depot left behind by members of Admiral Byrd's Second Antarctic Expedition from 1933 to 1935. The depot was located on a small rocky promontory near Durham Point close to the mouth of the Scott Glacier less than 300 miles from the South Pole. The research team was looking for mosses, lichens and invertebrates in the southern Trans Antarctic Mountains.

The depot contained three crampons and a set of wooden extendable survey poles. Two of the crampons were stamped with the initials QAB indicating that they belonged to Quin A. Blackburn. The remaining crampon was engraved with RR, having belonged to Richard Russell. A second RR crampon was also found on its own about 100 metres away from the depot. One of the survey poles has the name Cox burned onto the surface.

Photo by Jason Watson, courtesy of Antarctica New Zealand

Byrd party depot

Quin Blackburn was the leader of a geological party from Byrd's second expedition to Antarctica which investigated the geology of the neighbouring Queen Maud Mountains and sledged the length of the Scott Glacier onto the Polar Plateau. Richard Russell was one of the members of the geological party, and Cox was the carpenter on Byrd's expedition. The geological party dog sledged across the Ross Ice Shelf from Admiral Byrd's Antarctic base (Little America II) and ascended the Scott Glacier to the polar plateau.

Professor Bryan Storey, director of Gateway Antarctica, the Centre for Antarctic Studies and Research at the University of Canterbury, who discovered the depot, said "It was amazing to find traces of a previous expedition. In some ways you hope to be the first people to set foot on such a remote location but you know that early explorers have been there previously. The crampons were in remarkable condition considering that they have sat there for nearly 80 years, the straps have disintegrated but the buckles remained. There was no rust due to the dry windblown environment." The depot was left intact bar a single crampon which was removed and will be donated to a museum most likely in New Zealand.

Richard Byrd (1888-1957) was an American admiral and explorer. He is credited with adding a larger region to the map of Antarctica than any other explorer, and he was also largely responsible for modern-day U.S. involvement in the continent. In his first Antarctic expedition (1928-1930), Admiral Byrd achieved what was believed to be the first flight over the South Pole. His second expedition (1933-35) added considerably to scientific and geographic knowledge about Antarctica and pioneered the successful use of tractors. ❑

Within Our Ranks: Susan Solomon

Susan Solomon is widely recognized as one of the leaders in the field of atmospheric science. Since receiving her PhD in chemistry from The University of California at Berkeley in 1981, she has been employed by the National Oceanic and Atmospheric Administration. Her scientific papers have provided not only key measurements but also theoretical understanding regarding ozone destruction.

In 1986 and 1987, she served as the head project scientist of the National Ozone Expedition at McMurdo Station, Antarctica, and made some of the first measurements there that pointed towards chlorofluorocarbons as the cause of the ozone hole. In 1994, an Antarctic glacier was named in her honor in recognition of that work.

In March 2000, she received the National Medal of Science, the United States' highest scientific honor, for "key insights in explaining the cause of the Antarctic ozone hole." Additional honors and awards defy summary, but include the highest awards from several professional societies, plus the Commonwealth Prize, Lemaitre Prize and Blue Planet Prize, among many others.

Solomon also provided her expertise for the Intergovernmental Panel on Climate Change, which received the Nobel Peace Prize jointly with Al Gore, Jr., in 2007. Her international reputation extended to receipt of the Grande Medaille of the Academy of Sciences in Paris for her leadership in ozone and climate science in 2008. And it all started, in part, with her declaration that CFCs were a major contributor to ozone in Antarctica, alerting the world to a major issue that continues to affect all of us. ❑

Byrd Expedition Member Anthony Wayne Is Honored At Age 96

The January 2011 issue of *The Polar Times* had an article on page 18 honoring Anthony Wayne, the last Byrd expedition man, who lives in Schenectady.

Laura Snow, daughter of Ashley Snow who was pilot on the United States Antarctic Service Expedition of 1939-41, last year proposed a geographic feature to honor Wayne. Roger Payne, secretary of the Advisory Committee on Antarctic Names, advised Snow on May 6, 2011, that the Antarctic feature Wayne Head was approved in March. Wayne Head is across the entrance to Gaul Cove on Horseshoe Island, opposite Gibbs Point, which is named after George Gibbs, cook on the USS *Bear*. Wayne and Gibbs were shipmates on *Bear*.

The feature Wayne Head has come as a surprise birthday present for Anthony Wayne, who had his 96th birthday on June 12, 2011. The feature is located at 67°48'S, 67°08'W, in Marguerite Bay, near the USASE base on Stonington Island. The formal description of Wayne Head can be viewed on the U.S. Geological Survey Geographic Names Information System under Antarctic Names. ❑

[Since our January 2011 issue, a second "last Byrd man," Robert Johnson, has surfaced, as you can read in the below article by Laura Snow. Thanks to Billy-Ace Baker, frequent contributor to The Polar Times, *for bringing us the news about Mr. Johnson. —Ed.]*

Within Our Ranks: Paul Siple

Paul Allman Siple was born in Montpelier, Ohio, on December 18, 1908. When he was 10, his family moved to Erie, Pennsylvania. Two years later, Paul joined the Boy Scouts of America — not knowing at the time that this would be his first step toward fame as a polar explorer, scientist and inventor as well as a major force in the presence of the United States in Antarctica.

As winner of a national competition of Boy Scouts who were vying to accompany Admiral Byrd on Byrd's first Antarctic expedition in 1929, Eagle Scout Siple spent the first of his many visits to Antarctica in various capacities, including leader of the first wintering at the U.S. station at the South Pole, which was a factor in featuring him on the front cover of the December 31, 1956, issue of *Time* magazine.

Siple was not the first Boy Scout to join an Antarctic expedition, as Sir Ernest Shackleton chose two Scouts on his Quest Expedition in 1922; neither was Siple the last for that honor, as the U.S. program continued thereafter to include scouts in summer programs. However, the success of his performance with Byrd in several expeditions, his hard-work ethic and leadership qualities with his companions in the field, earned him considerable recognition throughout his career.

From experiments made by Siple and Charles Passel in the U.S. Antarctic Service Expedition, 1939-41, Siple devised an index of wind-chill numbers. His four winters and 10 summers in Antarctica produced four books relating to his experiences, and he is also known for eight patents for the development of clothing, protective devices and building design. In the early 1960s he served as the first U.S scientific attaché to Australia and New Zealand, marking the end of a remarkable career that began as an Eagle Scout who spent his 21st birthday on the ice. ❑

Robert Johnson, Another 'Byrd Man'

by Laura Snow

Robert Johnson — then and now

Robert Johnson was 15 when he signed on as a crewmember of the *Pacific Queen*, an old full-rigged, three-masted ship embarking on a zoological specimen collecting trip to Cedros Island off the coast of Mexico. On the return trip the ship ran into a storm, the sails ripped, the crew ran out of food and the vessel was unable to make port. Depite these hardships, Johnson's experience on the *Pacific Queen* was just the beginning of his life at sea.

When he turned 17, Johnson joined the U.S. Navy. His first ship was the USS *Pennsylvania* on which he served for 18 months before receiving orders to the USS *Bear*, Admiral Richard Byrd's flagship on the U.S. Antarctic Service Expedition of 1939-1941.

The youngest crewmember at 19, Johnson still had more sailing experience than anyone on the *Bear*, except for the Norwegian sailing master and ice pilot, Bendik Johansen. The *Bear* would roll 40 and 50 degrees and, at times, it seemed as though the bow was underwater. Johnson has vivid memories of when the *Bear* reached the ice and of Lieutenant Commander Cruzen spending hours in the crow's nest, sandwiches and coffee being delivered to him, and descending after two days.

In 1946, Johnson returned to Antarctica on Operation High Jump, this time as a member of the ice party. He and two other personnel decided they wanted to make a parachute jump. Cruzen, now an admiral, told them they had to come up with a good reason for the jump. The men received Cruzen's permission after they reported the jump would assist in the advancement of sled dog rescue. Johnson, who had never parachuted, received his training from the time the R-4D left the surface until it reached 2,000 feet. After the jump, membership cards were made for the only three members of the "Polar Silk Society" and were signed by Admiral Byrd and Admiral Cruzen.

In 1947, Johnson returned to Antarctica as the chief boatswain's mate on the USS *Burton Island*. On the return voyage to the United States, the *Burton Island* hit a storm and took a 52° roll. Johnson says he remembers that moment as though it were yesterday. The ship, he says, shuddered as it paused but finally righted itself much to the crew's relief.

Johnson is one of two known surviving crewmen of the USS *Bear*, 1939-1941. He retired from the U.S. Navy and lives in Florida. ❑

Charles Swithinbank at Union Glacier Camp, Antarctica

One of our honored luminaries, Dr. Charles Swithinbank, spent 10 days in the Heritage Range of the Ellsworth Mountains at the invitation of Antarctic Logistics and Expeditions. The camp at Union Glacier is located 8 km from the base of Mount Rossman, at 79°45'S, 83°14'W, about 70km northwest of Patriot Hills, the site of the company's previous camp that was the hub of adventure tourism for some 20 years.

As a fully-certified runway for intercontinental jets, Union Glacier hosts aircraft from the U.S., British Antarctic Survey and other nationalities. The blue-ice runway is one of several that Dr. Swithinbank identified in Antarctica as part of a project to locate potential landing sites for wheeled aircraft. The photos show a Russian Ilyushin about to land on the runway, and visitors on the airstrip after landing. Swithinbank also visited the U.S. Amundsen-Scott South Pole station on 20 December as part of his visit as a passenger on ALE's Twin Otter. The plaque at the South Pole commemorates both first arrivals at the Pole — Roald Amundsen and Captain R.F. Scott. ❑

Air Almaty Ilyushin-76TD landing on Union Glacier, Heritage Range, Antarctica (26 December 2010). The blue ice runway is operated by Antarctic Logistics and Expeditions LLC, a Salt Lake City-based company flying passengers and cargo from Punta Arenas, Chile. Ski-equipped aircraft carry expeditions and individuals farther to any part of Antarctica. — Photos by Charles Swithinbank

Climate: No Longer Poles Apart

by David J. Tenenbaum
http://whyfiles.org/2011/climate-simple-beautiful/

Vostok, at the "pole of cold," is a long-term Russian polar research station. — Photo courtesy of NASA

Climate: Mucking with the mechanism?

For decades, scientists have thought that the pre-historic Antarctic climate was governed by events at the other end of the planet — in the Arctic. That's because variations in solar radiation in the northern summer tracked nicely with the temperature record from sediment cores and ice cores taken on or around Antarctica.

Our record of temperatures in the deep south is carried in the ratios of oxygen and hydrogen isotopes (atoms with different masses) contained in ice cores. But Thomas Laepple, of the Alfred Wegener Institute for Polar and Marine Research in Germany, has just published an article maintaining that because the Antarctic ice cores did not accumulate at a steady pace, they have not been interpreted correctly.

Today, more snow (the source of ice), gathers in winter. Because that likely also happened in the past, ice cores from Antarctic tell us more about winter than summer, says Laepple.

And God created winter!

When Laepple and his colleagues factored in this seasonal effect, the level of sunlight in the southern hemisphere suddenly began to explain Antarctic temperatures. Although the orbital cycles still globally affect solar radiation, there was no longer a need to look at the other end of the Earth to explain rhythms in Antarctic temperatures.

The orbital cycles in question are named for Serbian engineer Milutin Milankovitch, who, about a century ago, sought to understand how three slow shifts in Earth's orbit would affect the amount of sunshine in different regions, different seasons and years.

These orbital variations, which are influenced by gravity of the moon, sun, Jupiter and Saturn, are the basis of the "Milankovitch cycle."

As scientists examined ocean sediments and then ice cores, the Milankovitch influence on solar radiation in the Northern hemisphere became the accepted explanation for the changing global climate. But when Laepple factored in the seasonal nature of Antarctic snowfall, he found that Milankovitch could explain the climate on the southern continent more directly. "I don't question that the Milankovitch cycle has an influence on climate," says Laepple, "but I question that its influence on the Antarctic is coming through the Arctic."

The adjustment was needed because more ice accumulates during winter and does not affect the overall climate record, Laepple says, "but it completely changes the recording of the signal stemming from the precession of the earth axis, which was the evidence for the remote North-South connection."

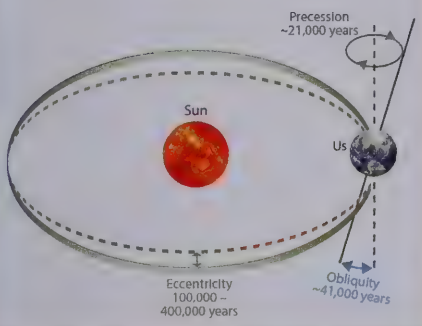
How would you explain it?

Climate is never simple, notes Richard Alley, a climate expert and professor of earth science at Penn State, who was not involved in the research. The Milankovitch cycle, he says, "shifts sunshine around on the planet, with more in some places and less in others, changing the length of seasons, the total sunshine during seasons ... so it is not surprising that multiple hypotheses can be advanced to explain a given climate record. Ultimately, the mere fact of correlation is not the answer; we seek understanding of the physical linkages. ... The new paper provides a clever new idea for a physical linkage, and I anticipate it will get

The Milankovitch cycle

The Milankovitch cycle tries to sum up the interactions of three long-term variations in Earth's orbit, which affect the amount of solar radiation during different seasons at different places.

- The tilt of Earth's axis (obliquity) changes, in a rhythm of about 41,000 years, between 22° and 24.5° from a line at 90° to the orbital plane.
- The axis changes its direction through "precession," relative to fixed stars over a 21,000-year period, changing the seasonal distribution of sunlight.
- The shape, or eccentricity, of the orbital ellipse varies on a complex rhythm that changes our distance to the sun during different seasons



people discussing and studying."

Any new study concerning climate processes could get sucked into the political vortex enmiring global warming, so we asked if Laepple's study of Antarctic conditions should lead us to question the widely-accepted theory that burning fossil fuels and changing land use have altered the climate.

Laepple reminded us that he's studying changes that occur over periods of 10,000 years. He also insists that the new analysis "will not change the basic record of glacial and interglacial periods — the march of ice ages over the past million years. We are focusing on the precession cycle [the 21,000-year cycle affecting the location of Earth's axis], as this provides the evidence showing where and how the climate is affected by radiation changes, and might hold the key to the mechanism of slow climate change."

Years ago, scientists began to revise their interpretation of Greenland ice to account for the seasonality in snowfall, Laepple says. "This new study is part of a long discussion. As we interpret the climate record, we have to focus more on how the climate signal gets recorded in the climate record." ❑

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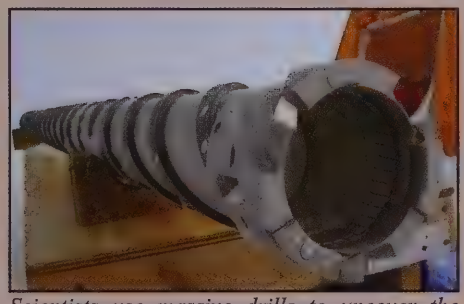
This 150,000-year-old piece of Antarctic ice is 10 centimeters in diameter, and was taken from a depth of 2,250 meters. After researchers clean, measure and catalog this core, it may be stored in a giant freezer. — Hans Oerter, Alfred Wegener Institute, Germany



Scientists use massive drills to uncover the stories about past climates told in ice cores (roll over for to see a core from a depth of 2,668 meters). — Steven Profaizer

Antarctica

A poem by Warren Salinger, February 2011

Antarctic finger pointing north draws you to its polar
bosom,
holds you in its icy grip.
Fog-smothered Antarctic morning soon becomes
sun-sliced as the day evolves.

Tabular bergs, half mile in length, move their forty million
tons
on seas propelled by ancient ocean currents.
Winds that wrap you in their soft caresses instantly change
to a dangerous gale force attack mode.

Penguins swim in frigid waters, gulping krill to feed their
hungry chicks,
exposing life's great chain of being;
krill feed the swimming birds, who feed the seals, as they
in turn
provide an Orca's evening meal.

Life's great chain of being.

But, most of all, Antarctica is silence — the sounds of
silence;
once I thought Mongolia had the loudest quiet —
yet earth below sixty degrees south has a silence all its
own,
louder than Mongolia's.

Shackleton, Scott, Amundsen, all must have heard it,
must have fought the howl of a blowing gale
that never made a sound inside their frozen heads,
blinding them to all that they would face.

Antarctic finger pointing north, draws you to its polar
bosom,
holds you in its magic silence.
Fin del mundo — end of the earth — proclaims Ushuaia
proudly,
while the end is still two thousand miles away. ❑

Antarctic Notes

Antarctica's Deep Frozen "Lakes"
***Science*, 25 March 2011** — An International Polar Year aerogeophysical investigation of the interior of East Antarctica above the subglacial Gamburtsev Mountains reveals widespread freeze-on caused by supercooling of subglacial water moving over rough basal topography. The study by Robin Bell and others was conducted in the area of the Chinese Kunlun Station at Dome Argus (Dome A), some 4,093 meters above sea level at 80°22'S, 77°21'E. Persistent freeze-on thickens the ice column, alters basal ice rheology and fabric and upwarps the overlying ice sheet. In East Antarctica, basal freeze-on has continued in the same locations through the last glacial-interglacial transition and has probably been a persistent process since East Antarctica evolved in a large ice sheet some 32 million years ago.

West Antarctic Ice Sheet (WAIS) Coring Reaches Record Depth
***U.S. Antarctic Program Antarctic Sun*, 31 January 2011, by Peter Rejcek** — A record depth of ice coring in the West Antarctic Ice Sheet at 3,331 meters (2 miles) will hopefully reveal climate information for the past 100,000 years, a critical time period for changes in global climate, including short-term intervals. The coring stopped about 100m above bedrock to avoid contamination of the ice-bedrock/water interface, but it is planned to drill further next season to explore layers of volcanic ash that occur in the ice layers, and can be dated, probably at 21,000 years ago. Better carbon dioxide records are expected from the core when analyzed in relation to temperature changes over longer periods of time.

Earthquake in Japan Caused Massive Ice Stream in Antarctica to Move
***New Scientist*, March 2011, by Anil Ananthaswany** — The magnitude 9.0 earthquake in Japan on 11 March caused a major ice stream in Antarctica to move suddenly about one-half meter. Whillans Ice Stream B, one of the major ice streams flowing from the West Antarctic Ice Sheet into the Ross Ice Shelf showed the movement that was observed by Jake Walker, University of California, Santa Cruz, whose team has monitored the ice stream since 2007 by means of GPS units on the ice. The ice stream normally moves about 1 meter a day in response to slip initiated by tides that affect the Ross Ice Shelf, but seismic waves that travel in the Earth can contribute to the movement, in this case not related to a tsunami. A similar event occurred as a result of the most recent earthquake in Chile.

Audi Announces Pole2Pole Expedition
***Audi Press Release*, 9 April 2011, by Jeff Glucker** — Auto manufacturer Audi has partnered with Swedish explorer Johan Ernst Nilson, who wants to traverse the 12,000-mile distance from the North Pole to the South Pole within 12 months. Beginning in early April 2011, Stages of travel include North Pole to the northernmost part of Greenland (on skis); northernmost Greenland to Thule Airbase (dogsled); Thule to Ottawa (sailing boat); Ottawa to Patagonia (bicycle); Patagonia to Antarctica (sailing boat); across Antarctica to the South Pole (kite-sledding). Audi is providing all logistics and specialized equipment for the expedition. Details about preparation are at www.audi.com/ar2010/pole2pole.

Irish Explorer Tom Crean Remembered With Greenland Peak
***BBC News Press Release*, 11 April 2011** — Tom Crean is known for his service with both Robert Falcon Scott and Sir Ernest Shackleton, being an important member of Scott's ill-fated Terra Nova expedition in 1911-12, and also in Shackleton's Endurance expedition of 1914-16, during which he undertook the sea journey from Elephant Island to South Georgia, followed by crossing of the island to reach a whaling station. A 700-meter peak in East Greenland was named for him by a climbing team.

Drone Aircraft Studies Ice Sheet in Antarctica
***CReSIS (Center for Remote Sensing of Ice Sheets)*, University of Kansas Press Release** — New Year's Eve, Dec. 31, 2009, was a momentous date for the U.S. Antarctic Program, for it heralded the launch of an unmanned drone aircraft, using the Pegasus runway at McMurdo for local test flights. The Meridian UAS aircraft (Unmanned Aircraft System) houses ice-penetrating radar, weighs 1,100 pounds, has a wing-span of 26 feet, and a range of 950 nautical miles at full 120 pound payload. The objective of the program is to measure and predict response of sea level change to mass balance of ice sheets in Antarctica and Greenland. Following flight tests in the U.S., tests are scheduled to be conducted for four weeks in Greenland in 2011, and proposed for Antarctica in January 2012 and the 2012-13 austral summer.

DAV Supports Review of Radiation Exposure in Antarctic Veterans
***New Zealand Antarctic Society*, Ice Files, April 2011** — The Disabled American Veterans (DAV) is supporting a request from Senator Sherrod Brown (Democrat-Ohio) that the Departments of Defense and Veterans Affairs evaluate the probability of radiation exposure from a leaking nuclear reactor at McMurdo Station may have caused cancer in veterans serving there from 1964 to 1973. A Final Operating Report for PM-3A Nuclear Power Plant, McMurdo Station, was prepared by the U.S. Naval Nuclear Power Unit, Fort Belvoir, Virginia, which cites numerous malfunctions and a problem with chloride stress corrosion, with an ultimate decision to dismantle the plant and remove it from Antarctica.

Discovery of Large Conical Stromatolites in Lake Untersee, Antarctica
***Geobiology*, (2011), 9: 280-293, by D.T. Andersen et al.** — Lake Untersee is one of the largest and deepest freshwater lakes in East Antarctica. Located at 71°20'S, 13°45'E, in Queen Maud Land, the lake has a perennial ice cover. The floor of the lake is covered with microbial mats that include conical stromatolites that rise up to 0.5m above the floor. The structure might be an analog for Archean stromatolites.

No Bones About It: Fossil Traces of Animals Found in Transantarctic Mountains
***U.S. Antarctic Program Antarctic Sun*, 8 April 2011, by Peter Rejcek** — A field party led by Stephen Hastiotis, a paleontologist from the University of Kansas, has discovered traces created by animals (a science known as ichnology), such as burrows, footprints, and tracks, in rocks more than 200 million years old in the Central Transantarctic Mountains. Also found were fossilized tree trunks from about the Permian-Triassic boundary, about 250 million years ago, a time when Antarctica was still a part of the larger landmass called Gondwana.

Russia Plans to Spend $195 Million on Antarctic Research Up to 2013
***TerraDaily*, Moscow (RIA Novosti), 8 April 2011** — Plans also include investments up to 2020 of about $975 million dollars to produce five new vessels, new aircraft, and reconstruction of eight Russian stations. The objective includes development of monitoring of regional environment, improving research, and forecasting climate change.

Young Penguins Dying Due to Lack of Food
***TerraDaily*, 11 April 2011** — Only about 10 percent of baby penguins tagged by researchers are coming back in two to four years to breed, down from 40 to 50 percent in the 1970s, according to Wayne Trivelpiece and his co-authors in a study in the Proceedings of the National Academy of Sciences. Chinstrap penguins are the second largest group in the area after macaroni penguins, and are at particular risk because their population is restricted to one area, the South Shetland Islands. Krill, the primary food for the penguins, are the culprit because krill needs ice to survive, and as climate change causes more polar sea ice to melt, krill cannot breed or feast on the phytoplankton in the ice.

An Antarctic Buffet Where Whales Gather to Feast
***The New York Times*, 2 May 2011, by Nicholas Bakalar** — Scientists doing observations in May 2009 in the Wilhelmina Bay region of the Antarctic Peninsula have found an estimated two million tons of krill, and more than 300 humpback whales feeding on the krill. This is the densest population of these whales ever recorded, more than 15 per square mile. Researchers tagged 11 whales in Wilhelmina Bay and nearby Andvord Bay, and found they rested during the day, dived to more than 300 yards in the late afternoon, and fed intensively at night as the krill moved toward the surface. Douglas Nowacek, Assoc. Prof. at Duke University, says the future of whales and krill in the Antarctic remains in doubt.

Women Must Take a Pregnancy Test Before They Can Work for the U.S. in Antarctica
NSF/OPP website — For the first time ever, the U.S. Antarctic Program is requiring any woman of childbearing age who wants to work for them to take a pregnancy test. As a result of a review by a medical panel in May 2010, a memo was issued by the NSF in 2011 outlining a new policy that discusses the testing requirement. The reasoning behind the policy is that clinics at U.S. stations are not equipped or staffed to provide adequate prenatal care, manage obstetric emergencies, and medical evacuation might be necessary. This would become more critical during the isolated Antarctic winter, when there are few transportation options.

Antarctic Explorers' Memorial Unveiled
Our Amazing Planet, and Event Program — An Evensong was held at St. Paul's Cathedral in London, England, on 10 May 2011, to honor Britons killed in British Antarctic Territory in pursuit of science. The list of 29 names of those who died spans the period from 1948 to 2003. The memorial plaque in London reads "For those who lost their lives in Antarctica in pursuit of science to benefit us all," is dedicated in the crypt of the Cathedral. The first phase of another memorial, The Antarctic Monument, was installed at the Scott Polar Research Institute in Cambridge on May 12.

Penguin Poop Monitored From Space
***LiveScience Staff*, 1 June 2009** — Stains of penguin poop visible from space are helping scientists map emperor penguin colonies, shedding light on how the birds are adapting to environmental changes. Satellite imagery shows areas of the droppings, but resolution does not allow details to show penguins *per se*. With satellite images, a British Antarctic Survey team surveyed the sea-ice around 90 percent of Antarctica's coastline and identified 38 colonies. Ten of those were new. The research appeared in the journal Global Ecology and Biogeography, September 2009, by Peter Fretwell and Philip Trathan.

Antarctica Mappers Turn Eyes to the North Pole
***Our Amazing Planet*, msnbc.com, 10 May 2011** — Scientists with University of Minnesota's Polar Geospatial Center have been mapping the rugged terrain in Antarctica since 2007 and now plan to expand their efforts to the North Pole. The work impacts everything from research to the movement of glaciers to the study of penguin colonies to the landing of military aircraft in remote locations, according to Paul Morin, geophysicist and team leader at the university. The Polar Geospatial Center staffs an office in McMurdo every year in summer, and is part of a five-year cooperative agreement with the National Science Foundation.

Seabee Museum Open During Seabee Days
***Ventura County Star*, 4 May 2011, by Andrea Howry, Lighthouse Editor** — The new U.S. Seabee Museum just outside the gates of Naval Base Ventura County, Port Hueneme, will open July 22, 2011, the first days of Seabee Days. The 60-year-old previous museum was shut down in 2010, and will be replaced by a new facility that will include a small theater where visitors can watch a movie about Seabees in World War II, and then head into rooms detailing Seabee involvement in Korea, Vietnam and Antarctica. A slide show will illustrate Seabees' humanitarian efforts of the past 20 years.

Ozone and Rainfall
***Science*, v. 332, p. 951-954, 30 May 2011, by S.M. Kang et al.** — Widespread use of CFC's during the second half of the twentieth century caused a stratospheric ozone hole over Antarctica, resulting in a modification of the thermal structure of the atmosphere and dynamic changes in atmospheric circulation within the Antarctic atmospheric vortex and at lower latitudes. One of the consequences of these changes was a summertime increase in precipitation in the southern subtropics, highlighting the importance of polar regions for the subtropical hydrological cycle.

Should Alaska Build Its Own Arctic Icebreaker?
***Alaska Dispatch*, 21 June 2011, by Patti Epler** — Anchorage Senator Lesil McGuire addressed the Alaska Imperative Conference in June with a proposal for Alaska to build its own Arctic icebreaker, using some of the billions of dollars in Alaska's budget reserve accounts. The $1 billion cost for a new icebreaker that was stated in a recent Congressional Research Service report would replace aging U.S. icebreakers that are more than 30 years old, and the likelihood of funding a new one, or fixing up one of the existing ones at a cost of $500 million to last another 25 years, is debatable. Alaska's proposed icebreaker could be used for search and rescue operations and help in oil spill response. Meanwhile, Shell Oil, anticipating offshore drilling development in the Arctic's Chukchi and Beaufort Seas, has moved ahead with its own icebreaking vessels designed and built specifically to support exploration and drilling. Shell's second icebreaking vessel is currently being built at a shipyard in Louisiana, with completion expected by the end of 2011. Shell's current icebreaking vessel, *Nanuk*, is three years old, and the new one (*Hull 247*) will provide newer technology when completed. Each cost Shell more than $100 million.

Argentine Icebreaker *Irizar* Refurbished for 2012–13 Antarctic season
***MercoPress*, 29 May 2011** — The Argentine Navy icebreaker *Almirante Irizar*, which became an almost total loss after major fires in 2007 destroyed the engine room and power generating plant, is currently in Tandanor's shipyard in Argentina, with basic engineering reconstruction being done by an Argentina-Spanish consortium. The new *Irizar* will be focused more on scientific research than it contained previously. After refurbishment, the ship should be ready for service in the 2012-13 season following an investment of more than 100 million U.S. dollars, according to the Argentine press.

Sydney Film Festival: The Snowman
***FILMink Festival Coverage*, 15 June 2010, by Annette Basile** — In 1978, Jimmy Graham went to Antarctica as a survival instructor. A couple months later he was evacuated for medical reasons, suddenly and severely becoming mentally ill. His daughter, Julie Lamont, tries to answer the issue in *The Snowman*, her first feature-length film, featured in FILMink and presented at the Sydney Film Festival, June 2010. A conspiracy theory in this Australian documentary film states that Jimmy stumbled upon something top secret in Antarctica, and the CIA responded by giving him a "chemical lobotomy." Interesting idea, and also successful as the winner of the FOXTEL Australian Documentary Prize. [CIA is presumably not returning phone calls.]

Penguins Keep Warm With "The Wave" Cheer
***PloS ONE*, 1 June 2011, by D.P. Zitterbart, Barbara Weinecke, J.P. Butler, and Ben Fabry** — Emperor penguins huddled together use coordinated waves of movement to stay tightly packed, moving as a mass to stay warm and perhaps to improve blood circulation. The studies were conducted at a colony near Neumayer Station (Germany). All adults were males, facing the same way, and waiting for the females to return from feeding. As the mass of penguins moved, the huddled forms became more tightly packed, thus preserving heat.

Emperor Penguin Colony Vacated
***PloS ONE*, 6(2), Feb. 2011, by Phil Trathan, Peter T. Fretwell, and B. Stonehouse** — A colony of emperor penguins discovered in 1948 on Emperor Island, Dion Islands, Marguerite Bay, has disappeared. The population in 1948 was 150 breeding pairs, and by 1970 the numbers had been decreasing. In 2009, a high-resolution survey from the air found none. It is assumed that the colony has relocated, or else failed due to a lack of sea ice for breeding and rising air temperatures in the Antarctic Peninsula.

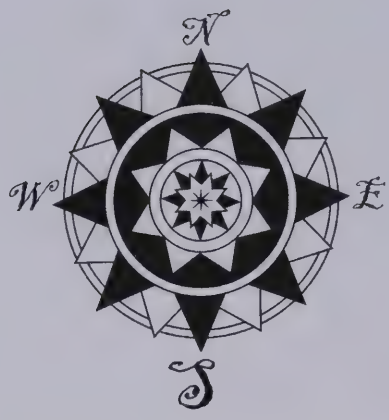
Raytheon Antarctica Com
***UPI.com*, 8 June 2011** — Raytheon has upgraded the communications network used by scientists and the U.S. Air Force in Antarctica. This is the third major upgrade at McMurdo Station for critical weather systems. The improvement is designed to support future scientific and environmental satellite missions of the U.S. Antarctic Program's three year-round stations. McMurdo Station also hosts the Air Force's Defense Meteorological Satellite Program. Other missions using McMurdo for satellite downlink include the NASA Near Earth Network Sciences and the European Organization for the Exploitation of Meteorological Satellites, or EUMETSAT polar-orbiting MetOp satellite. The upgrades include increasing the off-continent bandwidth from 20 megabits per second outbound to 60 megabits per second, along with integrating an alternate downlink station in Australia into the networks.

2,000 Miles Off Course
***Minneapolis StarTribune*, 22 June 2011, AP by Nick Perry** — A young emperor penguin appeared on the beach on the west coast of New Zealand's North Island in June, some 2,000 miles from its breeding site in Antarctica. The penguin was healthy, appeared robust and was presumably hatched in the last Antarctic winter, according to its juvenile plumage. The bird was seen eating sand and wood, and gradually appeared to be failing in health, so it was moved to the Wellington zoo to tend to it. [Story contined ...] ***Christchurch Press*, 25 June 2011** — The penguin was sedated and considerable sand and wood fragments were removed from its throat and stomach, and recovery appeared to be satisfactory. Zoo staff named it "Happy Feet" and fed it a fish slurry and provided ice for it to eat. Whether the penguin will be returned to Antarctica or remain in a zoo is uncertain.

Seal Off Menu for Antarctic Dinner
***Christchurch Press*, 23 June 2011, by Alastair Bull** — New Zealand staff at Scott Base in Antarctica marked the 100th anniversary of Scott's reaching the South Pole with a feast to match that of Scott's team to mark both the winter solstice and the midpoint of the journey to the South Pole. The dinner at Cape Evans was planned to re-create the menu that Scott's team used in 1911, except for seal, which the men said "We can't do that nor would we want to anyway."

Greenpeace Report Shows Lack of Direction by Supermarkets in Seafood Survey
***Minneapolis StarTribune*, 16 April 2011, by Mike Hughlett** — Five of the 20 major supermarkets Greenpeace surveyed in 2010 got failing grades for seafood sustainability, an improvement from previous years. Minneapolis-based Target, for example, has eliminated sale of Chilean sea bass, which originate in the Ross Sea, the world's only remaining "intact oceanic ecosystem." Minneapolis suburb Eden Prairie-based Supervalu, which operates a dozen supermarket chains nationwide, including Cub Foods, has no sustainable seafood policy. Chilean sea bass is also known as Patagonian toothfish, a species on the Greenpeace "red list," fish whose populations are collapsing.

[Regarding above] Kudos to Supervalu, but not to Greenpeace — Letter to the Editor by Gavin Gibbons, Director of Media Relations for the National Fisheries Institute, 6 May 2011
While Supervalu deserves credit for a seafood sustainability policy erroneously stated by the Greenpeace survey, crediting Greenpeace for the announcement would be a mistake. Greenpeace's seafood efforts with regard to retailers are not and never have been constructive but rather have been filled with bullying, boardroom blackmail, and even vandalism. ❑



Due South

by John Splettstoesser, Antarctic Editor

Polar enthusiasts are in the midst of planning for and celebrating two important anniversaries, one of them the beginning of ***The Polar Times***, publication of the American Polar Society, some 75 years ago. For that special event, the Society is in early stages of planning for a special Symposium in 2012 with a theme that will include presentations on "**The Polar Regions in the 21st Century: Globalization, Climate Change and Geopolitics,**" subjects that will cover much of what is happening in these remote parts of the world. Along with this anticipated event will be the production of a special issue of *The Polar Times*, the journal that the Society initiated with its first issue in June 1935. Major news events in the early years of the journal will highlight the contents, reminding readers of expeditions and individuals of times past.

Another anniversary that is dominating the news in 2011 is the centennial of the achievement of the South Pole by Roald Amundsen and Captain R. F. Scott in December 1911 and January 1912, respectively. Adventure and travel organizations, tourists, history buffs of mainly Norwegian or British nationalities are lining up to reenact the original routes of Amundsen and Scott from the coast to the South Pole. Some intend to ski, others will drive to the Pole by truck, and some will have an easier time of it by flights to near the Pole and ski the remaining distance. There will be no sleds with dogs on any of these adventures, for dogs were banned from Antarctica in 1994 as a precaution of the possibility of dogs transferring distemper to the seal population. A list of potential companies in the planning stages reveals adventure travel simply by their names – Arctic Odysseys, Icetrek, Northwest Passage, Voyage Concepts, and Extreme World Races.

Getting onto the continent can be achieved in several ways, one of them by flights from gateway ports to temporary summer camps to begin the expeditions. Many of those will have the logistical support of companies specializing in that role for many years, namely, Adventure Network International/Antarctic Logistics and Expeditions (ANI/ALE), a member of the International Association of Antarctica Tour Operators (IAATO), an organization formed in 1991 to manage tourism activities on the continent. Most people visit Antarctica by tour ship, but to reach the geographic South Pole, support based from camps in the interior is the only way to get there.

As one example of how this will be achieved, a British company will fly its clients from Cape Town to Antarctica in mid-December 2011, using a Russian station as a starting point with time to acclimatize before being flown to the starting point several hundred kilometers from the Pole and then ski the remaining distance. Raising money for charity is one of the objectives of the expedition. Logistics arrangements are costly in virtually any exercise in this Centennial year or any other time in Antarctica because of the cost of fuel and aircraft. Costs per individual can range from $40,000 to $55,000 or more, depending on the route and manner of travel and associated requirements in the interior. Getting to gateway ports such as Cape Town and Punta Arenas, Chile, involves additional cost.

The area encompassing the South Pole was designated as an Antarctic Specially Managed Area (ASMA) under the Antarctic Treaty, as "ASMA No. 5, Amundsen-Scott South Pole Station, South Pole (2007)." The Treaty Parties felt that the South Pole area required special management to ensure that the scientific, environmental, and historical values of the Area were conserved through management of the diverse activities occurring at the South Pole. The aim was to manage the activities at the South Pole, including scientific research, logistics, media, education, tourism, etc., in a manner that preserves the values of the area. Under the ASMA management plan, certain areas are only open for scientific research or for station operations and other areas are open to visitors, such as the ceremonial South Pole and the non-governmental camping site. The National Science Foundation's U.S. Antarctic Program operates South Pole Station. While the increasing number of expeditions and visitors has put a strain on the station personnel, a limited tour of the station is offered whenever possible as an education and outreach effort. It should be noted that the policy of the U.S. government precludes the offering of support or other services to non-governmental expeditions, which are expected to have obtained expedition insurance and have contracted for search and rescue services.

A variation on the South Pole objective is an expedition intending to visit the location on the Ross Ice Shelf where Scott's tent was discovered by a search party in November 1912 with the frozen bodies of Scott, Wilson, and Bowers inside, found after the polar party did not return to base at Cape Evans. At that location, the tent and occupants were still some 220km from shelter on Ross Island at Hut Point. A special ceremony is intended for this event, even though the tent is no longer at that location. (See Antarctic Notes, *The Polar Times*, January 2011, p. 22, for "International Scott Centenary Expedition.") The Ross Ice Shelf, a large floating mass of land ice attached to the coastline, and about the size of France in area, moves northward to the front, or barrier, at the rate of about one or more meters a day, which puts Scott's tent to have moved about 60km horizontally and buried by 16m of ice as a result of surface accumulation and drifting. It is estimated that the tent will reach the front of the ice shelf around the year 2250 and will be about 100m deep. An iceberg calving from the front will eventually take the tent seaward and the bodies committed to the deep. Details of Scott's last camp are in an article in the July 2011 issue of *Polar Record*, as is a companion article on the present location of the tent that Amundsen left at the South Pole in December 1911.

Glacier ice at the South Pole is some 2,900m thick and moves at the horizontal rate of about 10m per year. Because of that movement, plus snow accumulation and drifting, it has been estimated that Amundsen's tent is within some 2 to 2.5km from the Pole, and lying 17m below the present surface.

An expedition from the North Pole to the South Pole is sponsored by Audi to commemorate the achievement of the North Pole by Peary and the South Pole by Amundsen and Scott. See "Antarctic Notes" (pp. 12-13) for further details.

Finally, it should be mentioned that an additional expedition to reach the Pole met with fatal consequences, when a yacht entered

Continued at right

50th Anniversary of First Geologic Expedition in the Ellsworth Mountains, Antarctica

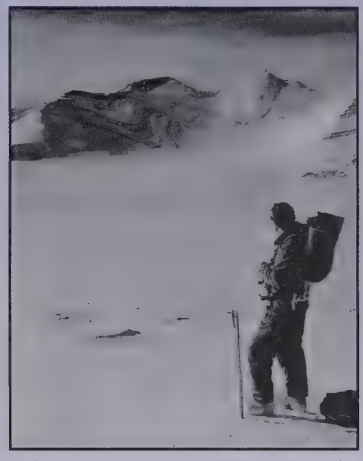
by John Splettstoesser

In the 1961-1962 austral summer, a geologic expedition from the University of Minnesota worked in the Ellsworth Mountains, the first group to set foot there and conduct reconnaissance studies of major exposures of rock outcrops in a mapping program. The Ellsworth Mountains lie in the interior of West Antarctica, centered at 79°S, 85°W. The mountains were discovered by Lincoln Ellsworth on November 23, 1935, during his flight from Dundee Island near the tip of the Antarctic Peninsula to a point just short of Admiral Richard Byrd's Little America base on the Ross Ice Shelf. Ellsworth did not view most of the range that lay to the south of his flight track and thus did not see the highest peak in Antarctica, Vinson Massif, located in the Sentinel Range.

Field camp on Minnesota Glacier, Anderson Massif in background in northern Heritage Range.

In November 1961, the first of three successive University of Minnesota expeditions in the Ellsworth Mountains began under the direction of C. Craddock, Professor of Geology at the University, with funding by the National Science Foundation. In the 1961-1962 season, under the field leadership of geologist John J. Anderson, most of the western Sentinel Range and some of the eastern Heritage Range were traversed by motor toboggans, and the basic structure and upper rock layers were determined. Other members of the 1961-1962 group were geologists Thomas W. Bastien, Paul G. Schmidt, and John Splettstoesser. The photos are representative of the field season scenes and events that lasted into the first week of February 1962, when the field party was evacuated by the U.S. Navy. Photographs shown here were taken by Thomas Bastien as a tribute to his role in the expedition. Tom passed away unexpectedly on July 4, 2010 — his obituary was printed in *The Polar Times*, January 2011, p. 29. ❑

How We Traveled: *Typical day of motor toboggan travel during the expedition, showing two Eliason model motor toboggans, towing cargo sleds that transported all supplies during the field season. Paul Schmidt (left), John Anderson (middle), and John Splettstoesser (right).*



John Splettstoesser is viewing the geology of Polarstar Peak with its folded rock strata of argillite and sandstone. In a later season, coal beds and Glossopteris *fossil plant remains were found in back of the ridge.* Polar Star *was the name of the airplane in which Ellsworth made his historic trans-Antarctic flight of November 23, 1935.*

Continued from left

the Ross Sea and left two men on land to begin the trek to the Pole. Unfortunately, a storm developed at sea and a distress signal was received from the yacht on February 22, 2011. Considerable efforts were made to search for it and the three men aboard without success, and the search was suspended on March 1. A life raft from the yacht was found, but with no evidence of survivors. Related information is that the yacht did not follow procedures of applying for a permit to visit Antarctica from its home office in Norway, a requirement of the Antarctic Treaty, and it also was not part of the membership of IAATO, although membership is not required for anyone to access information on guidelines for yachts operating in Antarctica from the IAATO website. This unfortunate example is one that Antarctic Parties classify as "adventure" (extreme) tourism, which often call into play search-and-rescue operations by National Program vessels and aircraft that are taken away from their normal assignments for research and the support of science.

Other events related to the 100th anniversary of the South Pole discovery are probably too numerous to list, but one of them, the Scott 100: Plymouth Conference, 4-6 June 2011, held at the University of Plymouth, U.K., included talks, plays, musical performances and the like to honor the city where Scott was born and lived until the age of 14 when he joined the Royal Navy.

The Antarctican Society (Port Clyde, Maine, U.S.) joined with other celebrants of this historic event by producing a Centennial Medallion which depicts a scene at the South Pole and the arrival dates of both Amundsen and Scott.

This is my opening venture into compiling the column "Due South," a narrative that my predecessor Jeff Rubin wrote so expertly to inform readers of timely events about Antarctica. I can only hope I can fill those experienced shoes in my endeavor. ❑

• OBITUARIES •

Addendum to the July 2011 issue of The Polar Times

Robert C. Balchunas

Robert C. Balchunas (CDR, U.S. Navy Ret.), 81, died November 24, 2010. He was a 29-year veteran of the U.S. Navy, and served during the Korean War. He was one of the first hurricane hunters for the Navy, and also Executive Officer of Antarctic Support Activities in Deep Freeze 1971, 1972, and 1973. Balchunas Pass, McCuddin Mountains, Marie Byrd Land, Antarctica, was named for him. ❑

Ambassador Jorge Berguño Barnes

The Antarctic community is mourning the passing of one of the most significant diplomats, Ambassador Jorge Berguño, who passed away on 8 May 2011. He was born in San Bernardo, Chile, 29 January 1929, joined the Chilean Ministry of Foreign Affairs in 1953 and was active as a diplomat and academic until his death. His diplomatic activities included Chilean Ambassador to Australia from 1985 to 1987, and he was a champion of the ideals of the Antarctic Treaty System for many years, attending Antarctic Treaty Consultative Meetings as a member of the Chilean delegation. His higher education included a degree in Law and Social Sciences, Catholic University of Chile, 1954; Master of Public Affairs, Woodrow Wilson School, Princeton University, 1955-57; Doctor in International Affairs, American University, Wash., D.C., 1965-67; and Ph.D. in International Relations, Pacific Western University, 1983. He published widely on international affairs, the Antarctic, and the Law of the Sea, as well as on history, exploration, and science. He leaves behind his wife and 5 children, two of whom have followed in their father's footsteps in the Foreign Service of Chile. – Excerpts from Tony Press (Australia) and Undersecretary for Foreign Affairs Fernando Schmidt Ariztia. ❑

Raymond Charles Bonnabeau

Raymond C. Bonnabeau, Major General, U.S. Army (Ret.), M.D., Ph.D., died February 26, 2011, at age 77 at his home in St. Paul, Minnesota. He received a BS from Fordham University, M.D. from the State University of New York, and Ph.D. in surgery from the University of Minnesota, participating in pioneer work in heart surgery with Dr. C. Walton Lillehei. He went to Antarctica in the 1960-61 austral summer as physician for the University of Minnesota Geological Expedition to the Jones Mountains, discovered the year before on a flight from Byrd Station to the Eights Coast. Prof. Cam Craddock was aboard then and led the expedition to the mountain range the following year. Ray was an alumnus of the Army War College and the Kennedy School of Government at Harvard University. He served in the U.S. Army in Vietnam as chief of surgery at the 95th Evacuation Hospital (China Beach); commander of the 73rd Combat Support Hospital in Cedar Rapids, Iowa; the 5501st Army Hospital in Fort Snelling, Minnesota; the 30th Hospital Center in Chicago; and Deputy Surgeon General of the Army for Mobilization and Reserve Affairs, retiring in 1994 as a Major General. Until his death he was a physician at the Minneapolis Veterans Administration Hospital. In the 1960-61 field season, he joined in as one of the team members (five of them geology students at the University) in pulling his share of the work, including an 11-day traverse from the main Jamesway camp to unknown parts of the mountains. With no motorized toboggans available to the party that season, Ray, Cam Craddock and i man hauled Akhio sleds on that 11-day excursion, setting up camps along the route and conducting geologic investigations. He also took weather observations during the time we were in the field, and also conducted a medical project on expedition members, from which we all survived. Fortunately for all of us, Ray had only minor situations in which his medical proficiency was required. Bonnabeau Dome in the Jones Mountains is named for him. ❑ ***(John Splettstoesser)***

John "Jack" Child

Jack Child (1938-2011), Professor of Spanish and Latin American Studies at American University, died June 18, 2011, at the age of 73 of complications following open-heart surgery at the National Naval Medical Center in Bethesda, Maryland. Jack was born of American parents in Buenos Aires, Argentina, and lived there until the age of 18, when he moved to the U.S. and attended Yale University, graduating in 1960. Since then he enjoyed two related but very different careers, stemming from his residence in Argentina. He entered the U.S. Army and served as a Latin American specialist until retirement in 1980, retiring at the rank of Lieutenant Colonel. His military career included the 101st Airborne Division with two tours in Vietnam; a brief assignment in Cambodia (which won him the Bronze Star); Colombia; West Point' Joint Chiefs of Staff; and the Inter-American Defense College.

He earned his MA and Ph.D. degrees at American University while on active duty. Jack Child's research focused on cultural studies and conflict resolution in Latin America, with a focus on Antarctica and the Falkland/Malvinas Islands, concentrating on peace-keeping and confidence-building measures. In 1980 he joined American University's School of International Service as Assistant Dean. He rose through the academic ranks and was recently promoted to University Professor, one of only seven at the University. A true scholar, he authored or co-authored 13 books in his field, as well as over a hundred articles and book chapters. Subjects ranged from military geopolitics of South America, the Central American peace process, and competing strategic claims in Antarctica. A book on the subject was published as "***Antarctica and South American Politics: Frozen Lebensraum***." His reputation in these subjects resulted in grants from the U.S. Institute of Peace and the International Peace Academy. His hobby of stamp collecting produced a book on the semiotics and politics of Latin American postage stamps, a book I reviewed for ***The Polar Times***, July 2009, p. 33. His interest in high latitudes took him on 14 trips as staff lecturer on expedition cruises to Antarctica, South Georgia, and the Falkland Islands. I traveled with Jack and his wife on many of those cruises, and became impressed at his approach to the subjects of Latin American culture and politics, including in-depth presentations of the Argentine-Falklands war of 1982. He recounted his years in Argentina to the age of 18, when he would have been conscripted into the Argentine army, which might have brought him into the conflict that taught him in school that the Falklands belonged to Argentina, not Britain. His choice to move to America and join the U.S. Army was one he never regretted, as his knowledge of Latin America and fluency in Spanish showed him to be a highly skilled translator and interpreter, an asset in his military career and teaching. He will be missed for his sense of humor, and deep commitment to teaching and scholarship. ❑ ***John Splettstoesser, with information from Jack's family, American University, and an obituary that Jack himself wrote on 23 May 2011, one week before open-heart surgery.***

Willi Dansgaard

Willi Dansgaard, a world-renowned Danish paleoclimatologist, died January 8, 2011, in Copenhagen at the age of 88. He was born there on August 30, 1922, and received his doctorate in physics at the University of Copenhagen, where he spent his entire career. He was famous for his research on ice-core interpretation from 19 expeditions to glaciers in Norway and Greenland, and visited Antarctica once, in 1975, to sample snow from a 6-ft pit at the Soviet station Vostok in collaboration with John Splettstoesser and N. Barkov, and conduct research related to the Ross Ice Shelf Project. His research, together with that of Hans Oeschger and Claude Lorius, revolutionized scientific knowledge of how

temperature and composition of the atmosphere have changed over the last 150,000 years, thus demonstrating a clear link between carbon dioxide and methane concentrations and global temperatures. Working with Chester C. Langway, Jr., and a close collaboration with the U.S. Army Cold Regions Research and Engineering Laboratory, he demonstrated that past climate could be deduced from analysis of oxygen isotopes in ice cores. He observed that about 15,000 years ago, Greenland abruptly warmed by 16 degrees over a period of 50 years, a great surprise to researchers who had previously assumed that such major changes in climate to occur over thousands of years. This finding was subsequently confirmed by Oeschger, and such abrupt climate changes have since been known as Dansgaard-Oeschger events. ❑

John Splettstoesser and* Los Angeles Times, *February 7, 2011.

John Holmes Dearborn

John Holmes Dearborn, 77, distinguished and emeritus professor of marine sciences at the University of Maine, died November 24, 2010, at his home. He was born February 26, 1933, in Bangor. His interests in the marine environment and its life began early, as a boatman at the National Audubon Society Camp of Maine on Hog Island in 1951 and 1952. He received a Bachelor of Arts degree in zoology from the University of New Hampshire in 1955, working as a museum assistant at the University and for three summers at the Marine Biological Laboratory, Woods Hole, Massachusetts. In summer 1956 he was a field assistant with the U.S. Fish and Wildlife Service Laboratory, Boothbay Harbor. He received a Master of Science degree in zoology from Michigan State University in 1957, followed by work with Alaska Department of Fish and Game. His doctoral work was at Stanford University, beginning in 1958, which included work as Antarctic Research Assistant from 1958 to 1965. In 1959 and again in 1961, he wintered at McMurdo Station, collecting marine invertebrates for his doctoral research, which he received from Stanford in 1965. John began his long career at the University of Maine in 1966 as an assistant professor, and retired officially in 1999. Field work collecting marine invertebrates included five more trips to Antarctica, two to the Arctic, and a cruise to the Juan Fernandez Islands, Chile. John was the first person to receive two major faculty awards at the University. Mount Dearborn, Willett Range, Victoria Land, is named for him. ❑

Bangor Daily News

Robert A. Helliwell

Dr. Robert A. Helliwell, emeritus professor of electrical engineering at Stanford University, passed away peacefully on May 3, 2011, at age 90. He was a widely recognized authority on the dynamics of the magnetosphere and in 1965 wrote a still relevant book on the subject, Whistlers and Related Ionospheric Phenomena.

Dr. Helliwell (like others who worked for him or did graduate work with him I could never quite bring myself to call him "Bob") had more influence on the direction of my life and profession than any other person, outside of my parents. It was under his contract with National Science Foundation that I was employed in Antarctica for the austral winter of 1964 at Byrd Station. That was my first year out of graduate school at Stanford and was the first of ten trips that I made to Antarctica. The experiences of traveling to Antarctica and working on the frontiers of basic science was a major influence in my life. When I was hired, I had not quite finished my masters degree work. Helliwell thought that I should have this behind me before I left for a year on the ice; so he suggested that I do a library research paper under his tutelage to finish my credits. The result – a paper on Japanese research on VLF (Very Low Frequency) phenomena – taught me a great deal about the subject and about scholarly presentation in general. Furthermore, some of the phrases in the Japanese literature were so colorful, that I added an appendix of them to the paper. I had wondered how he would take my enjoyment of Japanese-English scientific jargon. He was delighted!

Helliwell was born on September 2, 1920, in Red Wing, Minnesota. After his father died when he was young, his mother moved her family to Palo Alto. Thus, he was a local kid at Stanford. He received his undergrad degree in electrical engineering in 1942. Among his teachers was the legendary professor of electrical engineering and the "father of Silicon Valley", Fredrick A. Terman. As an undergraduate, Helliwell helped operate Stanford's ionospheric sounder – the dynamics of ionosphere was among Terman's many interests. With so much of the engineering faculty engaged in wartime activities, the electrical engineering department was short of experienced teachers, and Helliwell began teaching even before he graduated. He received his engineer's degree in 1944, formally joined the faculty in 1946, and was granted his PhD in 1948. In 1950 a graduate student told him about strange descending whistling tones that could be heard when listening to the radio sounds made by distant lightning storms. After a bit of doubt – Helliwell wrote in the October 1982 issue of the Stanford Engineer, "I suggested that if he took a short vacation the sounds would go away" – Helliwell heard the noises himself and devoted a good part of his professional career to their study and interpretation.

In 1956 he was a lead author of an article in Journal of Geophysical Research on "nose whistlers". A nose whistler has both an ascending and a descending component. The shape of the nose whistler was found to be dependent on the magnetic line along which the whistler traveled AND the particle density along the path. Thus whistler analysis became a very useful tool to trace the behavior of the magnetosphere and to probe particle densities far into space.

The Helliwell group at Stanford was very productive and well respected. It encompassed several senior researchers, an accomplished engineering section to analyze spectra and design equipment, a number of field personnel (my initial role), and many graduate students over the years. The National Science Foundation obviously thought highly of the group's work, as many projects and proposals were funded. John Katsufrakis was Helliwell's right hand person and helped guide the far flung research projects. John's practical knowledge and his familiarity with the grant proposal side of research were a perfect complement to Helliwell's mastery of the theory and experimental techniques.

Helliwell early recognized the potential for significant research in Antarctica. Not only were the Antarctic stations relatively free of interference, but the proximity to the geomagnetic pole meant that the whistlers received in Antarctica had traveled far out into space, following lines of magnetic force. In the December 1970 issue of the Bulletin of the Atomic Scientists, Helliwell wrote, "The Antarctic is unparalleled as a scientific laboratory for the study of the upper atmosphere. Its geographic location, its freedom from many of the limitations of civilization, and the spirit of international cooperation fostered by the Antarctic Treaty combine to make this forbidding continent unique in the history of science." In Antarctica Stanford receiving instrumentation was placed at Old Byrd, New Byrd, Eights, South Pole, Vostok, and aboard the USNS Eltanin. These stations were a part of a world-wide network of stations of which 51 are identified in his book. In addition, active VLF transmitters were placed at Byrd Long Wire, at Siple Station, and aboard satellites.

Helliwell had early recognized the potential for experimentation with man-made VLF signals. In 1957 he arranged to have the Navy's VLF transmitter at Annapolis, MD send pulses at regular intervals. There followed observations of other Navy VLF signals. These sometimes triggered VLF emissions. In order to investigate these phenomena further, a transmitter was installed near Byrd Station – Byrd Long Wire. But the most interesting place for these experiments was expected to be at a somewhat lower geomagnetic latitude, and thus the idea of Siple Station was born. Siple became the crown jewel of the Stanford program. A transmitter at that station could be tuned to various frequencies and pulse lengths. It fed a thirteen mile long antenna elevated on poles above the snow. Don Carpenter, one of the senior researchers in Helliwell's group writes that "Conducted between 1973 and 1988, those experiments produced a rich body of data on the properties of the Coherent Wave Instability, by which weak injected narrow band ($<$10 Hz bandwidth) whistler-mode waves propagating along field aligned paths regularly underwent fast temporal growth by of order 30 dB to saturation levels and also triggered free running emissions."

Helliwell was an active member of the scientific community for nearly 70 years. He authored or co-authored over 130 papers in addition to his book. Don Carpenter writes, "Bob was quite unselfish with respect to the authorship of papers. If much of the work being described

in a paper was yours, then he expected you to be the lead author, and would not add his name unless he had been a major contributor to the work." He supervised the work of 44 doctoral students, several of whom wintered in Antarctica. One of his graduate students, Umran Inan, now heads the VLF group at Stanford. In 1972 Helliwell received the Appleton prize from the International Radio Science Union (URSI) for outstanding contributions to ionospheric research. He was a Fellow of IEEE as well as AGU, served as President of the AGU section on Solar Terrestrial Relations, and chaired several committees of the National Academy of Sciences. Helliwell Hills in northern Victoria Land is named for him.

Helliwell was predeceased by his wife, Jean, who died in 2001. She was also a Stanford graduate and had been his high school sweetheart. They shared a love of fencing, and she was at one time the Stanford fencing coach for both the women's and men's teams. He is survived by his sons, Bradley of Sedona, Ariz., David of Arcata, Calif., and Richard of Colorado Springs, Colo.; his daughter, Donna, of Sunnyvale; four grandchildren and one great grandchild. A memorial service was held at Stanford on June 7. ❑ ***(Robert Flint Jr.)***

W. Barclay Kamb

California Institute of Technology Professor Emeritus Walter Barclay Kamb died at his home in Pasadena, California, on April 21, 2011. He was 79. Kamb was a geologist with a strong background in physics, and was best known for his work in glaciology. His contributions are extraordinarily wide-ranging, extending from X-ray diffraction investigations of high-pressure polymorphs of ice to hot-water drilling to the bed of West Antarctic ice streams. His research was marked by brilliant theoretical expertise combined with bold and inventive field work.

Kamb spent his entire academic life at Caltech, entering as an undergraduate in 1948 at age 16, completing his undergraduate degree in physics in 1952, his PhD in geology in 1956, and then immediately entering the Caltech faculty as assistant professor of geology. He rose to full professor in in 1962 and was named Rawn Professor in 1990. Kamb also served as chair of the Division of Geological and Planetary Sciences from 1972 to 1983 and Caltech Vice President and Provost from 1987 to 1989.

Barclay Kamb's entry into glaciology from geology and physics was guided by two other Caltech legends: geologist Bob Sharp and chemist Linus Pauling. Both as an undergraduate and graduate student, Barclay kept a foot in both earth sciences and physics and was strongly influenced by both Sharp and Pauling; as an undergraduate physics major, he took Sharp's geology and glaciology classes, and as a geology PhD student he choose Pauling as his advisor, using X-ray diffraction to study the structure of zunyite. On completing his PhD, Barclay returned again to Bob Sharp's fold, joining the Department of Geology, but with Pauling still engaged (both as mentor and, a year after graduating, as father-in-law) in Barclay's first glaciological research, again using X-ray diffraction to study the crystallography of high-pressure polymorphs of ice.

Barclay's physics background placed him directly in line with theoretically-oriented glaciologists like the University of Bristol's John Nye and Northwestern's Hans Weertman, and made him an ideal complement to Bob Sharp's process-oriented, geologically-based approach. (Sharp himself came into glaciology through the explorer and mapmaker Walter Wood.) Barclay's mathematical and physics orientation also fit not only Caltech's intrinsically technical emphasis but also the quantitative, analytical style of glaciological research that was evolving in the US, Great Britain, and Europe during the late 1950s and early 1960s. Barclay's early research on the crystal structure of ice polymorphs led, along with his interest in mountains and the outdoors, to questions of the mechanical behavior of polycrystalline glacier ice, and participation in field research on ice dynamics, organized by Bob Sharp as part of the International Geophysical Year, at Blue Glacier in the Olympic Mountains of Washington State. The Blue Glacier field program led to highly successful collaborations through the 1960s with many colleagues, including Ron Shreve, Clarence Allen, Ed LaChapelle, Mark Meier, and Dick Hubley, and ground-breaking work on the structure of glacier ice at large scales, ice petrofabrics, deformation near the glacier bed, and early investigations of basal sliding properties, including some of the very first direct observations of sliding.

The Blue Glacier project also involved extended collaboration with Charlie Raymond, at the University of Washington, and Will Harrison, at the University of Alaska, both Caltech graduates themselves. In the early 1970s, when Raymond and Harrison started a long study of Variegated Glacier in Alaska, anticipating a surge sometime in the 1980s (the Variegated had a history of surging, or periodically accelerating, every 20 years or so), Barclay was quick to join forces. With a cadre of graduate students and his long-time collaborator Hermann Engelhardt, Barclay developed a hot-water drilling system and wide variety of instruments to put down holes to the bed of the glacier. Television cameras, pressure transducers, water and sediment samplers, explosive charges, all went down the holes to the bed of the glacier in the late 1970s and early 1980s and brought back up data from which Barclay and his colleagues developed theories, based in part on earlier work done both in Alaska and Europe, that helped to explain the episodic nature of glacier surges and glacier sliding more generally. The theoretical achievement would have been remarkable enough on its own, but the technical complexities given to the project by the fact that the drill and the ice were all being carried downglacier at 25 or 30 meters per day gave the whole enterprise a twist that put Barclay and his colleagues in a class by themselves.

From Variegated Glacier, the next logical step was Columbia Glacier, a rapidly-retreating ocean-terminating glacier further up the Alaskan coast in the Chugach Mountains, where Mark Meier of the USGS was conducting an extensive research program. Columbia Glacier moved almost as fast as Variegated Glacier, at about 10 meters per day, was if anything even more intensely crevassed, and at one kilometer in depth was about four times thicker than Variegated Glacier. The technical and logistical barriers overcome at Variegated stood the Caltech crew in good stead at Columbia, and a drill camp was established out in what had appeared to be a completely inaccessible reach of the glacier, and once again, new and unique data came up out of the holes and informed new theories of ocean-terminating glaciers in retreat.

After Alaska, the next compelling challenges were the ice streams draining the West Antarctic Ice Sheet into the Ross Ice Shelf. Charlie Bentley and his students at the University of Wisconsin had made tremendous progress in the late 1980s using seismic methods to identify the unusual characteristics of a water-saturated till layer at the bed of several of these fast-moving outlets, and Barclay moved his field operation to Antarctica to drill through the ice streams. The results of those field seasons expanded still further the knowledge of ice-bed interactions and the complex mechanics of sliding of ice over water-saturated till. Barclay's contributions to the theory of basal sliding and ice bed interactions are still, nearly thirty years later, core concepts in what is arguably the most important controlling process in glacier and ice sheet dynamics.

Barclay was good-natured and imperturbable, brilliant without having to act the part. On a glacier or in the laboratory, he was approachable and open, always curious, and ready to consider a new problem.

Barclay was also unflaggingly analytic. No part of life was too mundane to discourage close examination. Perhaps Barclay's most famous domestic improvement was the "incubator," a device he built originally at Blue Glacier to treat sewage according to Park Service requirements. The system, which could boil over if surrounding temperatures weren't just right, was finicky and offered a fine challenge for Barclay. He persevered as he moved on to other locations and, after a few years, the system worked fairly reliably.

If there was a hint of eccentricity in a few of Barclay's minor passions, there was, in all of them, an element of Barclay as a craftsman, bringing to bear his particular tools on the world around him; explaining, organizing, improving. Barclay, ultimately, making the world a better place.

Barclay's later years were troubled by Parkinson's disease, a slow-moving death sentence that he resisted with great and characteristic energy and grace, assisted with equal poise and patience by his wife, Linda. Barclay continued to attend seminars and the occasional meeting for as long as possible. I saw him for the last time a few years ago in Seattle,

at a small meeting of glaciologists. Barclay was engaged, asking penetrating questions, no longer standing at the front of the room and presenting the headliner, but nearly everything that others presented owed something to work that he had done before. At one point during a lunch we shared, someone asked a question and Barclay stopped to gaze out at the horizon before answering, still the same Barclay that we had all know for years, explaining, organizing, making the world a better place. ❑ ***(W. Tad Pfeffer, University of Colorado)***

Hugo Neuburg

Hugo Alfred Carl Neuburg died December 16, 2010, at the age of 91 in Blacksburg, Virginia. He was born August 25, 1920, in Hoboken, New Jersey, and was a graduate of New York University. Neuburg served in the Signal Corps in the U.S. Army in World War II, and after the war took part in exploring Mt. Wrangell, a remote and unknown part of Alaska. He specialized in climate information and cosmic ray research. His talent and experience stretched in many directions. He was widely known in the polar community as a physicist and glaciologist, having served ten tours in Antarctica, including wintering at Ellsworth Station in the International Geophysical Year.

Hugo loved to engineer things. During the winter at Ellsworth he designed a near perfect "deep pit" for glaciology studies, about 110 feet deep, inclined fifteen feet from the vertical with plywood platforms along the side at 17 foot intervals. This pit was 3-m square and tapered to 2-m square at the bottom. Hugo enlisted all of the 5 oversnow traverse party members (including Ed Thiel and John Behrendt, geophysicists, and Paul Walker and Nolan Aughenbaugh, who assisted in the glaciology of the pit. This pit was about a quarter mile away from Ellsworth Station and these men worked outside in 50 miles/hour winds at 50-60 degrees below zero F.

One of Hugo's proudest accomplishments during the winter was the re-tempering of the springs for the Sno-Cat clutch, which the careless geophysicists (primarily John Behrendt) had burned out. Without this repair the oversnow Filchner Ice Shelf traverse during the following summer would not have been possible.

Hugo co-led the Filchner Ice Shelf traverse with Ed Thiel. In addition to being the chief glaciologist on the traverse, Hugo had to serve as mechanic to keep the fragile Sno-Cats operational.

One of his many memorable characteristics was his habit of wearing his wool underwear shirt outside of his red flannel shirt, because the wool scratched his skin. There is a photo of him (in Behrendt's book "Innocents on the Ice" and the traverse party at the Dufek Massif dressed this way with the Explorers Club flag (which Hugo brought to Antarctica) on the side of a Sno-Cat.

Hugo navigated the traverse by taking theodolite sun shots to adjust the dead reckoning positions he determined by measuring the distance traveled in a day using a bicycle wheel. He had purchased the wheel for the purpose in Chile on the voyage south.

The 1300-mile-long Filchner Ice Shelf Traverse explored and mapped the previously unknown extent of what is now known as the Filchner-Ronne Ice Shelf. The first visit to Dufek Massif (previously seen from the air) was one of the high points of the traverse. Almost all of the 81-day traverse was spent in carefully working through heavily crevassed areas. Hugo chose to drive and ride in the lead vehicle with the crevasse detector (which never worked properly). Consequently his vehicle was the first to break into crevasses as snow bridges collapsed. Fortunately everyone survived, although one man had to be rescued when he fell about 20 feet down.

During the variety of investigations related to the Ross Ice Shelf Project under the direction of Ed Robinson, Hugo conducted a program of gravity measurements on a delicate platform on the floor of a Jamesway building on the ice shelf. A gravity meter was positioned there to record the tidal effects on the ice shelf, and when John Splettstoesser visited Hugo in January 1975, John unwittingly bumped the platform as he entered the Jamesway. Hugo very politely explained what that might do to the tidal record, and quickly entered the mishap in his log with the minuscule lettering that he was known for, and only he would seem to be able to interpret.

Suffice it to say, that Hugo was one of a kind, and there will never be another. ❑ ***(John Behrendt, with comments from John Splettstoesser, and excerpts from the*** **Roanoke Times*, Dec. 18, 2010.)***

Russell Pardoe

Russell Pardoe, 1932-2011, at 29 years old and freshly graduated in medicine with scant surgical experience, was working at Mawson base in 1961, with the Australian National Antarctic Expedition. When a base mechanic suffered a cerebral hemorrhage, he was challenged. By communicating with a surgeon in Melbourne by Morse Code, he got advice on what to do. He fashioned medical equipment out of dental tools and tested techniques first on a seal. Pardoe drilled through the man's skull twice to relieve pressure, then kept him alive for 2 months before enlisting the help of Russia, the U.S. and commercial aircraft to take his patient the 9600 km to Sydney, where he and the patient arrived in January 1962. The patient later made a full recovery. Pardoe was born in Brisbane on October 14, 1932, and as an all-round intrepid man, he set a record when he won the shot put at Barker College, and distinguished himself in rugby. During his undergraduate years he served with a reserve Australian Army unit, acquiring skills as a paratrooper, mountain climber, frogman, and pilot of planes and gliders. He graduated in medicine and surgery in 1958, worked in several countries, including New Guinea. In 1961, he went on the first of two assignments in Antarctica. Pardoe married in 1966 and moved to the U.S. and did a year's residency at Roswell Park Memorial Hospital in Buffalo, New York, in 1969, and in 1971 completed his residency in plastic surgery at Stanford University. He formed a private practice in plastic surgery in Eureka, California, becoming well known for reconstructive surgery and treatment of burns. At the age of 77, he was diagnosed with a brain tumor and died on February 17, 2011. Mount Pardoe in Enderby Land and Pardoe Peak in the Prince Charles Mountains, are named for him. ❑ ***Sydney Morning Herald*, 7 March 2011**

Leroy Sanford

Leroy Leonard Sanford, 76, of Douglas, Wyoming, died on May 5, 2011. He was born on June 24, 1934, at the family homestead near Douglas. He worked for 18 years for the U.S. Geological Survey, and was one of the early survey crews in Antarctica, traversing the planet from the South Pole to the North Pole area in one year's time. He also was instrumental in the development of topographic maps in Alaska, and several U.S. states. Investigators who have worked in the Dry Valleys west of McMurdo Sound can be thankful to him and others for his surveys in the 1971-72 austral summer that established a network of control for compilation of eight 1:50,000-scale maps of the Dry Valleys. Sanford Valley in the eastern Olympus Range is named for him. ❑

Jon Stephenson

Philip Jon Stephenson passed away 23 May 2011, in Townsville, North Queensland, Australia, at age 80. He graduated with a degree in geology with honours from University of Queensland, and later was geologist on the Commonwealth Trans-Antarctic Expedition, 1957-58, led by Sir Vivian Fuchs. Stephenson and Ken Blaiklock were the first to drive dogs to the South Pole since Roald Amundsen did in 1911. He was the first Australian to set foot at the Pole, on 20 January 1958 when the expedition arrived. He received a Ph.D. degree in geology from London University, worked for UNESCO in West Pakistan, and also on Heard Island with the Australian National Antarctic Program. In 1961 he founded the geology department at James Cook University, and retired in 1995. He was awarded the Australian Geographical Society Lifetime of Adventure Award for 2009, and has Stephenson Bastion in the Shackleton Range named for him, as well as Stephenson Glacier on Heard Island. He was the author of "Crevasse Roulette: The First Trans-Antarctic Crossing 1957-58, with a Foreword by Philip Law. A review by Jeff Rubin of this very interesting book was printed in the July 2010 issue of The Polar Times. – excerpted from Australian Geographic, June 1, 2011, by Natalie Miller. ❑

Survey Code: 2011_____

Please mail completed survey by August 17,2011

AMERICAN POLAR SOCIETY
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☐ Science ☐ Military ☐ Government ☐ Industry ☐ Journalism ☐ Other

2. My highest education level is: Bachelors____, Masters____, Ph.D. ____, Other_____ (please specify)

3. I am or have been a licensed professional under oversight by a governing body safeguarding the protection of the public interest (attorney, physician, engineer, certified public accountant, architect, commercial pilot, etc.):

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4. I have been to: ☐ The Arctic ☐ The Antarctic ☐ Both polar regions

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13. I intend to use the new APS website (http://www.americanpolar.org) and Facebook page to keep up with polar events and keep in touch with others interested in the Polar Regions:

☐ Yes ☐ No

Please fold, stamp and mail this survey. THANK YOU for your help! Your input is critical for a healthy and productive Society.

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Alfred S. McLaren, Captain, USN (Ret.), Ph.D.
President, The American Polar Society
P.O. Box 3120
Nederland, CO 80466

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American Polar Society

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Dear Members,

We need five minutes of your time. Please read on!

The American Polar Society (APS) is making the first serious effort in its 75-year history to solicit significant corporate support. We know that it won't be easy. It usually takes a membership roster many times the size of ours to bring in corporate dollars, because corporations really are not as socially responsible as they appear to be. Their primary interest is to increase sales and market share. As a result, they sponsor nonprofit charitable organizations that they believe can best help them to reach tens, if not hundreds, of thousands of new customers.

In our case, although our membership list is small, it is also unique. We are talking to corporations that know this and feel that our unusual membership base could help them. But, we need data to support APS's claim as to how unique we are.

Would you please help us by taking five minutes of your time to fill out and mail in the following brief survey? With the money that corporate support can bring, APS can schedule exciting new annual symposiums, including the International one scheduled for 2012. We can also publish a 75th Anniversary issue of the *Polar Times* later this year, continue publishing regular issues of the *Polar Times*, and inaugurate new programs, while still maintaining dues at an affordable level.

Your responses will be kept strictly confidential. Many thanks for pitching in!

Appreciatively,

Fred

Alfred S. McLaren

Evenki reindeer herders, Republic of Sakha, Siberia, Russia — Photo © Maria Vasilieva

The Evenki and the Critical Role of Their Shamans

by Moki Kokoris

The Evenki, formerly known as the Tungus, are spread over a huge territory (about 2,500,000km²) of the Siberian taiga, or boreal forest, from the Orb River in the west to the Sea of Okhotsk in the east, and from the Arctic Ocean in the north to Manchuria and Sakhalin in the south. Having occupied this vast region since the Neolithic era, they are recognized as one of the indigenous peoples of the Russian North with a population of more than 35,500. Anthropologically, the Evenki belong to the Baikal, a Paleo-Siberian Mongolian group.

The word "evenki" means "he who runs swifter than the reindeer." Traditionally a mixture of pastoralists and hunter-gatherers, their informal economy is based on reindeer-herding, fishing, sable and fox trapping, hunting moose and wild reindeer, and in the south, cattle herding. Milk, derived from their cattle and reindeer herds, is the most highly prized commodity. In the past, most Evenki lived in conical tents, or chums, made from birch bark or reindeer hides tied to birch poles. Today, however, the national railway, hydroelectric and mining projects, and other industrial developments across the territory have radically influenced their traditional way of life. Most Evenki, including the families of the nomadic herders, are now settled in Russian villages and belong to collective or state farms.

Reindeer are used as pack and riding animals, since they are best suited to travelling over the boggy terrain of the tundra. The skill of riding the domesticated reindeer allowed the Evenki to colonize vast areas of the eastern taiga, which had previously been impenetrable. The Evenki use a saddle that is unique to their culture, which as placed on the shoulders of the reindeer, lessens the strain on the animal. Instead of stirrups, the Evenki use a stick to balance themselves.

Photo by Maria Vasileva

Even dancers — Republic of Sakha, Siberia, Russia.

Prior to contact with the Russians, the belief system of the Evenki was animistic. Their religious practices are of great historical interest because they retain some extremely archaic forms of belief. Among the most ancient ideas are spiritualization of all natural phenomena and personification of them, belief in upper, middle, and lower worlds, as well as belief in the soul (omi) and certain totemistic concepts. There were also various magical rituals associated with hunting and guarding herds, most of which were conducted by shamans. (The word "shaman" is an Evenki word, introduced to the Western world by the Russians.)

Like those from Yakutia, Evenki shamans were known to be exceptionally powerful. Traditionally, shamans either inherited their powers or were selected by the spirits. They identified metaphysically with all things, be they trees, rocks, water, fire or the animals that provided food, clothing and shelter. While in a trance, a shaman could journey into the upper world to persuade the game master to release the animals for the hunters. The spirits of deceased animals were pacified by the shaman to protect a hunter's family from revenge.

Moose played a central role in Evenki rituals, and various rites performed before a moose hunt involved everyone in the group. The shaman would first walk into the forest, to the group's sacred tree, to locate the female spirit that protected their lands and ask for her help in the hunt. She in turn would send the shaman to a zoomorphic spirit, which took the form of a giant cow moose. Through the help of this spirit, the shaman could picture himself lassoing the quarry, and that vision would help bring the animals closer to the hunters. If insufficient animals had been caught, the shaman would again visit the spirit woman and steal magical strands of wool from her that would turn into animals as soon as he returned to camp and shook them. Sometimes several reindeer were sacrificed and eaten so that they could be resurrected as moose.

Shamans were also quite skilled at mediating conflicts between humans and spirits. They protected people from enemies, evil spirits, illness, bad luck and starva-

Photo by Maria Vasileva

Even children — Republic of Sakha, Siberia, Russia.

tion. Drums, chants, dances, sacrifice and specific rituals were their tools. These also acted as vehicles for communication with deceased ancestors, particularly at the moment of death.

Both men and women could be shamans, and many were also wise orators, humorous storytellers and singers. Younger shamans learned from their more experienced peers, and they studied the behavioral psychology of their group in order to better understand its social-historical fabric, which provided a strong knowledge base in order to make sound predictions.

Evenki shamans were shown respect by being given a place of honor, the best food, and access to the eldest member or family group for conversation. The group tended the shaman's reindeer and always gave the shaman the best fishing place. Typically, a shaman was paid between one and four reindeer for each ritual.

Evenki shaman, Feder Poligus, and his spirit helpers. Yenisei Province. 1907. PD

Shaman's headdress. Evenki. Far East region, the Zeya Basin. Late 19th century.

While some rites, such as foretelling the future or looking for a lost reindeer, were performed in an ordinary chum, the more complicated rituals were conducted in a special shaman's tent, which had strong connections with the lower, middle, and upper worlds through the hearth, a larch tree, and effigies. Symbolically, the hearth was seen as the beginning of life — the lower world — the home of the mistress of fire and rebirth. The larch was placed in the center of the tent, its roots in the hearth, and its branches extending through the top opening of the tent into the upper world. Shamans used the larch as a ladder to climb toward the upper world, while his or her spirit helpers rested on the tree's branches. The welfare and fate of individuals, the group, and the shaman were connected with the larch. The shaman's external animal soul and the souls of each group member resided in the tree. By hitting a drum that had a larch rim, the shaman allowed the animal soul to enter his or her body, and sent the spirit helpers to the underworld to check conditions before making the journey. This external soul was critical for the shaman's journeys within the middle world — the world of the humans.

It was said that: "If the tree dies, the shaman dies."

The shaman's tent was carefully protected from evil spirits and hostile shamans. Two wooden figurines, representing the shaman's ancestor spirits, were placed at the tent's entrance, and two large blocks of wood, symbolizing eels, were placed within sight of the tent to scare away or swallow harmful underworld spirits entering the middle world. Inside the shaman's tent, wooden effigies of moose, reindeer, salmon and other spirit animals were placed in strategic locations to trap any evil spirits that managed to pass through the other protective barriers.

The Evenki believed that illness and death were spirits sent by another group's shaman. Spirit helpers were called upon to swallow the disease spirit and carry it to the lower world, where it was released through the shaman's intestinal tract. A barricade or fence of larch saplings placed around the ill person or around the entire camp served as further protection.

The clothing, mask, and drum of a shaman were sacred and could not be used by anyone else; otherwise the spirits would be unable to hear the shaman. Each Evenki shaman boot, made from closely cropped reindeer hide turned inside out, had a different purpose; on the right foot, the shaman wore "the boot of the sun," and on the left was "the boot of the forest spirit monster." Both were decorated with anthropomorphic, ancestral, and protective symbols to help shamans journey safely between worlds. The overall composition and placement of the decorations reinforced the rites performed by the shamans, and assisted in maintaining the necessary harmony among people, nature and spirits. Boots worn by shamans during healing ceremonies had glyphs symbolizing snakes, frogs and figure eights, all of which possess the power to receive and transfer life-giving fertility.

All such shamanistic rituals and beliefs help indigenous people to preserve their identity and their strong spiritual connection with the environment, natural phenomena such as animals, rivers, weather, stars and other elements of the universe, as well as with their ancestors whose guidance and advice were critical to their survival. For more than two hundred years, shamanistic activities were prohibited, first by the tsars and later by the Soviet regime. Sadly in those days, indigenous shamans were repressed or killed, their wares confiscated. However, despite this oppression, shamanism persisted in the more remote regions. Today, it is enjoying a revival and is once again being practiced openly. ❑

Shaded green area indicates the territory of the Evenki & Even peoples of Siberia.

BACKDROP: © Illustration of Evenki reindeer rider from an Evenki fairytales book. Novosibirsk, 1971.

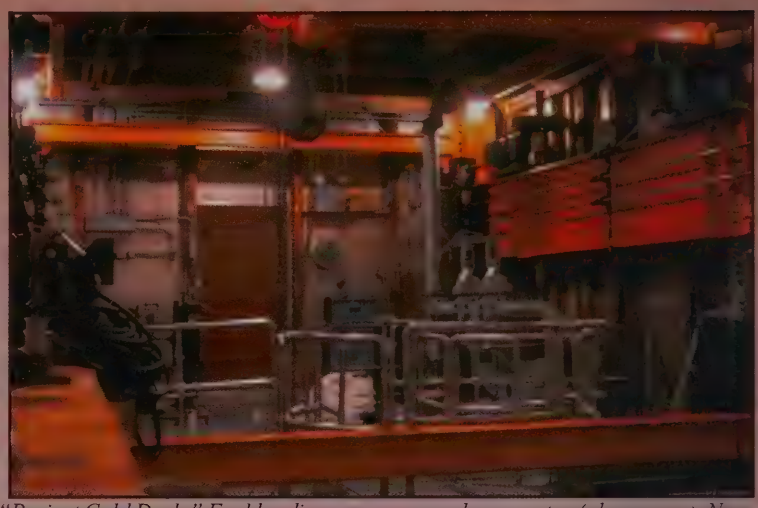
Evenki wooden home in ethnographic museum in Ulan Ude, Russia. PD

Camp Century: City Under the Ice

Story and photos by Herbert R. Drury

During the Cold War era of the 1950s–1960s, America's military was engaged in various projects in the Arctic regions, one of them being the establishment of research stations on the Greenland Ice Cap. I was privileged to work on three of these. My first one, in 1952, was with the U.S. Weather Bureau's Polar Operations Project at Thule Air Force Base in northwest Greenland, which has been described by Larry Taylor in our July 2008 issue. The second was Project Mint Julep for the Air Force in southwest Greenland about 100 miles east of Bluie West–Eight (BW-8) Air Base at Sondrestrom Fjord in 1953. The third, in the fall of 1960, found me at Camp Century, some 140 miles east of Thule under the snow surface of the Greenland Ice Cap. This was an experimental, prototype encampment completely submerged in one of the most remote, unique and difficult-to-reach locations on Earth.

The U.S. Army Polar Research and Development Center (PRDC) was established in 1958 to investigate engineering and scientific research problems in cold, hostile environments of both polar regions. Its mission was to study and perfect techniques for construction, testing, support, communications, engineering, scientific research and survival in adverse conditions and locations. These included studies of surface and subsurface construction techniques, ice movement and deformation, ice coring and analysis, snow depth conditions, G.I. clothing and equipment, transportation systems, meteorology and weather forecasting, human physiology and psychology, remote aerial sensing and much more. Some of the information developed would eventually be useful in certain lunar applications.



"Project Cold Deck." Fuel loading area over nuclear reactor (above core), Nov 1960, Camp Century, Greenland.

I was a civilian employee of the Army Engineers Snow, Ice, and Permafrost Research Establishment (SIPRE) of Wilmette, IL, in the Air Photo Interpretation Branch headquartered in Evanston, IL. We were later all moved to my old hometown of Hanover, NH, to become the new Cold Regions Research and Engineering Labs that also absorbed the Frost Effects Lab of Harvard University. Our mission, called Project Cold Deck, was in multiband sensing research, developing methods of detecting under-snow targets at Camp Century and elsewhere. We were working with Project Michigan and the U.S. Air Force, which employed an R4D aircraft from the University of Michigan based at Willow Run near Detroit. The idea was to have this airplane fly over Camp Century during the dark of winter to photograph the site with various remote sensing devices. These included photographic emulsions, infrared detectors, gold-doped Germanium cells, radar, masers, microwave and other image-intensifying techniques in all wavelengths of the light spectrum, visible and non-visible. Part of our job on the ground was to gather data on the snow, ice, and exposed camp structures during the time the aircraft was overhead. All this was to coordinate information on radiation, brightness, temperatures, humidity, wind velocity and electromagnetic forces of all surface and subsurface features of the "hidden" camp. This, among other useful purposes, would tell us what enemy spy planes might be able to see, should they ever get past our system of early warning defenses already scattered across the arctic and subarctic regions.

Polecats on trail to Camp Century

In addition to our work, there were many other scientific research projects under way at Century. One of these was the first nuclear reactor ever built under snow, to be followed later by one at America's McMurdo Station in Antarctica. It was an experiment to develop practical means of providing comfortable living conditions in a remote and harsh environment in order to be able to conduct studies without having to worry about survival.

The camp had been built and supplied using tractor-drawn trains, or "swings," with portable buildings and materials on large sleds that were towed out to the site from Camp Tuto (for Thule-Take-Off), 14 miles east of Thule. There, a ramp had been built up onto the snow, and a trail marked by flags on wooden poles led across the emptiness to Camp Century. It took about two weeks for each swing to reach its destination, and the army troops lived, slept and ate in quarters aboard the sleds. Fuel for all the camps was carried in countless barrels of diesel oil, and most supplies came by ship to North Star Bay, the ice-free port of Thule Air Base.

By setting up a nuclear reactor at Century,

a small amount of radioactive fuel, perhaps 100 pounds, was enough to replace thousands of barrels of diesel fuel so laboriously transported literally to the middle of nowhere. The reactor and its supporting mechanisms were housed in under-snow tunnels separate from the rest of our camp. A main tunnel with numerous side branches held buildings to house the troops and scientists, both military and civilian, along with a mess hall, recreation center, maintenance sheds, storerooms, sick bay, laboratories, meteorological station and a small prototype, thermally-heated ice core drill. Our water supply was from a steam–drilled well and reservoir deep in the ice outside of camp, well away from the latrines. We were allowed to photograph this, the reactor and other structures within the tunnels which had been created by the army's new "cut-and-cover" technique. (Unfortunately, after over 50 years, my old slides have largely faded, and most are no longer printable.) Huge Peter Snow Millers, similar to home snow blowers, cut trenches up to 30 feet deep which were then covered with corrugated steel arches. These were then covered by snow that quickly hardened like cement. The outer ends of each tunnel had a tube up to the surface with a submarine-type escape hatch in case of fire, and a few were placed near key central areas of the camp as well.

One of the problems being evaluated in this experimental development was the "closure" of glacial ice as it gradually moved or "flowed" as a result of its own weight toward the sea far from our 6,000-foot elevation. Ice is somewhat akin to Silly Putty® in that it is plastic-like, creeping or moving imperceptibly without visibly breaking. So men had to constantly "shave," the walls of our tunnels to keep passageways open.

Another problem area was around the mess hall, due to the heat from cooking. One part of our photo mission was to see to what extent the escaping heat showed up in aerial sensing images, as well as that emitted by the escape hatches, vehicle sheds, weather "met" shack and other structures above and below the snow surface. To camouflage the kitchen heat, fans were installed to blow cold air around the building and carry heat from the cooking stoves to the outside.

Temperatures inside the tunnels were usually freezing or below 0°F, but the buildings were generally in the comfortable 70°F range so that scientists and others could perform their assigned tasks under normal conditions. Unfortunately, at one point, the reactor had to be shut down until more lead shielding could be flown up to Thule and hauled out to camp in one of the weekly or biweekly tractor swings.

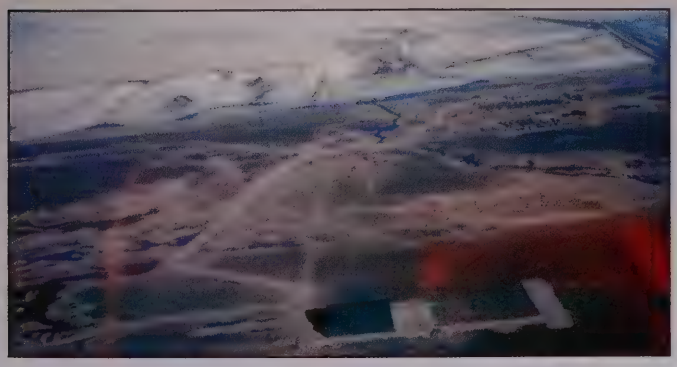
As V.I.P. civilian scientists, our personnel were transported to Century in much different swings consisting of Polecats or articulated Weasels, which were tracked vehicles somewhat akin to ski resort groomers, but doubled. They made the trip from Camp Tuto in 24 hours rather than the two weeks required by the tractor swings. The leading machine contained a motor and driver or two, while the attached and tracked second vehicle was the cab in which several people rode. I believe these "personnel carriers" were supposed to be heated, but the temperature inside ours was well below freezing as we rode out in October during daylight and back to Tuto in December darkness. I had to wrap up in a sleeping bag and put my feet on another one, on a shelf raised above the cold, to keep them warm. Anything in direct contact with the shelf or other surface soon began to freeze, thus the need for some sort of pillow as insulation. On one occasion we met up with one of the larger swings and stopped briefly. Later, our group of six Polecats halted abruptly because our driver had collapsed from carbon monoxide poisoning and had run into the vehicle ahead. He was put in our compartment to recover, and we eventually proceeded without further incident. Had there been any blizzard or "whiteout" to obscure the trail flags, we might all have had to stop, possibly for days, until the weather cleared. Such was life in that inhospitable place.

Polecat in Camp Century tunnel, Greenland Ice Cap, 10 Nov 1960. 140 miles east of Thule

When full-time darkness arrived by Thanksgiving, I ascended one of the escape tubes to take a photo of our camp by starlight. I managed to obtain a single picture before the camera froze. When the University of Michigan plane flew over, we were all outside electronically recording temperatures of selected surfaces or objects while aerial sensing was in progress. It was -60°F, and we wore every bit of G.I. clothing the army had issued to us! Thankfully, we were only exposed for about an hour in those conditions, but the chill went right through us like a proverbial knife. Now I know what so many early explorers must have endured while trying to learn more about the polar regions, and I marvel at their hardiness. We were carrying on their tradition, but in much better circumstances, for the benefit of all mankind.

The complete story of Camp Century can be found in various government publications, but perhaps the best contemporary summary is the book titled *City Under the Ice: The Story of Camp Century*, by Charles Michael Daugherty, published back in 1963 by Macmillan Company of New York. It is available on Amazon.com and may be available elsewhere on the web. ❑

Our barracks (c-5) at Camp Tuto, Greenland, 14 miles east of Thule.



Camp Tuto from air; ice cap road. (Photo courtesy SIPRE)

Celebrating Women of Discovery

by Moki Kokoris

Polar explorers and researchers are a rare breed. Even less commonly do they happen to be women, some of whom excel in their fields of interest and study extraordinarily enough to merit our attention and also accolades from notable institutions and organizations. WINGS WorldQuest is one such organization, whose mission it is to recognize and support visionary women who dedicate their lives to the advancement of scientific inquiry and environmental conservation. WINGS WorldQuest proudly shares and disseminates their stories and knowledge, with the objective of inspiring a new generation of female explorers, scientists and environmental stewards.

Each year, WING WorldQuest holds its Women of Discovery Awards gala event, which honors cutting-edge scientists and adventurers for making significant contributions to world knowledge through exploration. The awardees for 2011 were chosen for their pioneering research in human/environmental conflict, atmospheric chemistry, marine conservation, and Arctic survival.

The Sea Award was given to Anna Cummins, a specialist in marine conservation, sustainability, and ecology education.

The Courage Award went to Canadian herpetologist Kate Jackson for her groundbreaking work with snakes in Africa as chronicled in Mean and Lowly Things: Snakes, Science, and Survival in the Congo.

The Humanity Award was given to Gladys Kalema-Zikusoka, founder of Conservation Through Public Health, who has been instrumental in gorilla conservation in her native Uganda.

The Earth Award was granted to Catherine Powers, who studies mass extinction events, and noted that the extinction process in marine communities can be detected by the distribution of marine invertebrates that live on the ocean floor.

Separately, in recognition of their outstanding contributions to exploration and scientific research, WINGS WorldQuest also honored three women, who are already established in their respective careers, as Fellows:

Polly Wiessner, an anthropologist who spent three decades studying social networks and survival among the Kalahari Bushmen of southern Africa, and issues of warfare, religion, and exchange among the Enga of Papua New Guinea. Her more recent research focuses on the impact of globalization on traditional systems to understand how people adapt to a rapidly changing world.

© Gretel Ehrlich

Gretel Ehrlich with her Inuit guide. Greenland.

Katey Walter Anthony, who made headlines in 2007, when she and her team determined that methane bubbling out of numerous lakes in the Arctic was the likely source of the spike in atmospheric methane at the end of the last Ice Age. Her estimates are that ten times the amount of methane that is currently in the atmosphere will be released from these lakes as the Earth warms and permafrost thaws.

> *For on-the-spot confirmation of gas content, Katey strikes a match just above the hole. When flames leap out of the opening . . . she has found methane.*

Gretel Ehrlich, who is considered one of the great environmental writers of our time. She is the author of 14 books, including *The Solace of Open Spaces*, which was an overnight success, winning her many literary awards, and *This Cold Heaven: Seven Seasons in Greenland and The Future of Ice: A Journey into Cold*, both of which focus on life in the Arctic in a time of global warming.

Because of their polar bearing, Katey's and Gretel's Arctic endeavors warrant further elaboration.

Dr. Katey M. Walter Anthony is currently Assistant Professor at the Water and Environmental Research Center at the University of Alaska in Fairbanks, and is the recipient of the National Geographic Society's Early Explorer Award. She is also project coordinator for Russian-U.S. collaboration to monitor long-term climate change in cold regions, worked as Research Program Manager at The Prince William Sound Science Center and was a member of the Exxon Valdez Oil Spill Trustee Council. Katey also contributed methane research data to Al Gore's presentations to the U.S. Senate, and her work was included in numerous scientific articles and media ventures on climate change.

As the polar regions warm, rapidly thawing permafrost creates new Arctic lakes in a process called thermokarst lake formation. Katey's research reveals that as these lakes appear, the carbon that had been locked in the ground for thousands of years, converts to methane and carbon dioxide — the two most potent and volatile greenhouse gases. Traveling through Alaska and Russia, Katey explored this dangerous, self-perpetuating cycle: thawing permafrost caused by global warming releases methane, which contrib-

utes to global warming. The effects of the gas inside the bubbles she observed in Siberia's lake ice will eventually be felt across the entire planet. It is estimated that 50 billion tons of methane could enter the atmosphere from these lakes alone, which could cause global warming to accelerate beyond all previous projections.

Katey's fieldwork often brings her to areas that have been dubbed "drunken forests" — places where thawing permafrost has transformed woodlands into soggy wetlands dotted with dead and dying trees that tilt at haphazard angles. On particularly wet and cold mornings, she and her team put on frozen-stiff clothes, and venture out onto thin lake ice. After shoveling off snow, they chop open holes in the ice and lower plastic bubble traps into the water. A valve allows samples to be taken and brought back to the lab for further analysis. But for on-the-spot confirmation of gas content, Katey strikes a match just above the hole. When flames leap out of the opening — at times as high as the trees themselves — she has found methane. One of her more famous videos showing this phenomenon can be viewed at the following link: http://www.youtube.com/watch?v=YegdEOSQotE

Gretel traveled to the Arctic by skin boat, fixed-wing aircraft, helicopter, reindeer, and dogsled to live among the Inuit people.

Her connection with Siberia began when she was a high school exchange student, and her bond with the country and its people intensified when she returned to the region to work at a science station as a graduate student. According to Katey, Russian scientists were first to link thawing permafrost with methane release, and her long-term understanding of their unique capabilities helped her facilitate collaborations between scientists in Alaska and Russia, who now work together to monitor climate change.

Her fieldwork endeavors are harsh, risky and oftentimes lonely, but for Katey, they are deeply rewarding. She says, "I feel such a strong emotional tie with these extreme remote places. People who can last here love it. We chop firewood, collect berries, and fish. I like preserving those relationships with the land. When life is a little bit hard, it makes you appreciate the times you can come in and have a cup of soup."

Katey's statement is mirrored by a similar quotation by Gretel Ehrlich: "Everything in nature invites us constantly to be what we are.... There is nothing in nature that can't be taken as a sign of both morality and invigoration."

A devout environmentalist, consummate world traveler, and dubbed the Walt Whitman of Wyoming, Gretel Ehrlich is the author of 14 books, many of which earned awards such as the PEN Henry David Thoreau Prize and the Whiting Award. Her writing has appeared in *The New York Times*, *National Geographic*, *Harpers*, *The Atlantic*, *Time*, *Life*, *Architectural Digest*, *Audubon*, *Tricycle* and *Outside Magazine*, among other publications. In 2000, Gretel's *National Geographic Adventure* article on the Inuit of Greenland was nominated for a Feature Writing Award by the National Magazine Awards.

After being struck by lightning in 1991 (she recounted her ordeal and recovery in a memoir titled *A Match to the Heart*), she journeyed to Greenland to "get above tree line," where the latitude and altitude helped her manage and treat her irregular heartbeats. Made possible by a National Geographic Expeditions Grant for the 2007 International Polar Year, Gretel traveled to the Arctic by skin boat, fixed-wing aircraft, helicopter, reindeer, and dogsled to live among the Inuit people. Through her narratives, she shares with her readers her extensive scientific and cultural expertise, and probes Inuit spirituality.

It is in *This Cold Heaven* that she chronicled her many expeditions to Greenland over the course of seven years, during which she immersed herself in the subsistence lifestyle of Inuit hunters who, as the Arctic continue to warm and melt, are witnessing the destruction of their ecosystem and their way of life. The book talks about the history of the Inuit people who have existed there for nearly five thousand years, but it is Gretel's personal stories that bring it all to vivid light. Gretel experienced Greenland in every season, including the "dark time," and she also traveled on the ice during the bright midnight sun months. Interlaced with her accounts are excerpts from Knud Rasmussen's [the Danish-Inuit explorer and ethnographer] expedition notes, written between 1917 and 1924, which help elucidate the spiritual and material life of the Inuit hunter and villager before modernization.

When asked during an interview whether there is anyone in Greenland who doesn't know or isn't in some way related to Knud Rasmussen, Gretel mirthfully says: "Probably a couple of people. It's a tiny population. Of course, there are people... but everywhere you go, there is somebody whose grandmother sewed for him or whose great uncle traveled with him. He went on seven big expeditions and then he was around a lot so everybody had something to do with him."

With her deep insights and understanding of their society, Gretel believes that Inuit culture will survive, but with many adaptations and strong resolve. Their subsistence lifestyle is threatened by dramatic and rapidly changing conditions across the Arctic as a whole as the negative impacts of global warming multiply, but the Greenland Inuit have the political sophistication to fight for what they want. They travel to the capitol and testify in front of Parliament, insisting that they wish to maintain their traditional ways of life. There are enough of them who haven't been co-opted by the material empires of the West. They love their life. They are proud of who they are. They love nothing better than to go out with their dogs on the ice. They are also very aware that this is a fight for everyone everywhere to keep what's good and what should be respected.

Photo: Dmitri Drakluk © Katey Walter Anthony

Methane pockets accumulated in winter lake ice are flammable. Katey Walter Anthony, researcher with the Water & Environmental Research Center at the University of Alaska Fairbanks, lights methane as it escapes from a bubble in a frozen lake in Siberia.

So, it is to WINGS WorldQuest who salutes them and to the women honorees and their passions that we owe our gratitude, and whose endeavors we should all strive to not only encourage but also emulate. ❑

Due North

by Arctic Editors Herbert R. Drury and Moki Kokoris

HERB: My favorite topic is the Musk Ox Farm in Palmer, Alaska. It is now under new management, which has saved it from disaster with a greatly expanded newsletter and a more aggressive fund-raising administration. It is still in need of volunteer help and financial or material donations for the production of wonderful, soft, warm, beautiful qiviut wool garments, knitted by some two hundred native ladies in western Alaskan villages. This is a unique cottage industry like no other anywhere — a fine asset to our 49th state and well worth a visit.

The most obvious current problem in the North Country continues to center around global warming and its climatic change effects which are apparently felt sooner and more strongly in that area than elsewhere. Monitoring and predicting its dimensions is now big business all over the world, involving many nations both above and below the Equator. Studies by satellite, ship, aircraft, and afoot on land, sea and ice are continuing daily all over the Arctic. Dartmouth college scientists, for one example, are collecting rock samples from remote East Greenland for Beryllium-10 analysis related to glacial movements past and present. Other researchers are working on ice islands off far northern Canada studying ocean salinity and acidity, while European and American satellites monitor such conditions all over the north Atlantic and Pacific waters. Changing chemistry and temperatures are affecting ocean currents like the Gulf Stream that warms Western Europe and Scandinavia, as well as governing much of eastern North American weather. The recent severe storms on both sides of the Atlantic may be related to such changes, as well as exceptional ice melting in the North. The latter is being studied intensely by satellites that are now able to detect thickness and bulk on both land and sea for computer-generated models, to help predict the amount of solid water that is turning into liquid — where, how fast and why. Articles in *National Geographic*, *Audubon*, *Scientific American*, *Alaska* and numerous state or regional publications have recently documented results of these continuing changes. Elizabeth Kolbert, whose book I have reviewed in this issue, (see *Field Notes From a Catastrophe* on page 29), has eloquently shown in the April *National Geographic* magazine some of the results of rising sea acidity on sea life, which was followed by a May 2011 article on endangered tropical reefs. Such chemical alterations have also been producing or changing phytoplankton and algal blooms in polar waters, which in turn affect larger organisms in the food chain. Polar bears, walrus, seals, whales, fish, birds, humans and the microorganisms that feed these larger animals are all being affected by changes in ice cover, chemistry, currents and rising ocean levels that are being monitored ever more intensely in the polar regions.

International meetings continue to be held in places like Copenhagen, Mexico City, Bankok, Durban, South Africa and Nuuk, Greenland, to mention but a few, in an effort to find worldwide agreement on greenhouse gas reductions and ways to finance the process in developing nations as more and more evidence for climatic changes accumulates due to global warming, at least in part from industrial air and water pollution for which China and America are the biggest culprits! The web is full of accounts of other earth-damaging processes or materials such as tiny nano-particles like man-made soot; mercury methylation into toxic forms by aquatic microbes that end up in fish we eat; tundra plants being replaced by forests, or forest lands burning hotter and more often; and increasing droughts, floods and disruption of coastal populations, both animal and human, in the Arctic and elsewhere. Recent environmental movements have begun to shrink the ozone hole, according to the latest reports, and there are ever-expanding efforts to extend public awareness of new "green" ideas such as another Aspen Environment Forum at the Aspen Institute in Colorado this June.

Among many other, items of interest being debated in the media is the controversial Pebble Mine proposal for the Bristol Bay area of western Alaska. More and more consortia of environmental groups have ads against it in the magazines I see, and *National Geographic* had a very comprehensive article on it this past December. *Alaska* magazine had a polar bear story in this year's March issue and mapped out the new critical habitat designated by the Interior Department. The plight of Arctic walrus has been photographed in popular magazines and television recently, as well as how pollution is affecting arctic Beluga whales, seals and fish. Sweden is working on oxygenating dead areas of the Baltic Sea floor and cooperating with Russia on new satellite studies of the high latitudes. In turn, Russia has settled an old northern border problem with Norway, is planning new Arctic conferences and a park, plus more oil rigs in the Sea of Okhotsk where one of her icebreakers recently rescued several other ships from the ice. Norway is working on tidal energy projects with Scotland, some types of which are described in the latest *National Geographic* magazine. A new salt-monitoring satellite recently arrived in California from South America to be launched from Vandenberg Air Force Base for polar work. Iceland has been arguing with Europe over north Atlantic mackerel quotas, while Europe has been decrying Swedish wolf culls and is planning greater polar investments. Canada is increasing its military presence in the Northern Provinces, while Russia continues to soft-pedal its similar developments amid a new ice-island research program. The latter nation just experienced a nuclear leak in an old Finnish-built ice breaker in Arctic waters, the latest of three such accidents in recent years among their fleet of almost two dozen such ships, while America finally may begin retrofitting one of our old icebreakers. That, along with the research vessel *Healy*, would now give us a grand total of — wait for it — two such active vessels in our miniscule polar fleet!

The fourth of four volumes on *America's Climate Choices* for our Congress, released this month, stresses the need for immediate local, state, national and international cooperation on greenhouse gas emissions. Secretary of State Hillary Clinton is addressing this in recent Arctic Council meetings of the eight northern hemisphere nations surrounding the Pole. Meanwhile NATO worries about the looming military and economic scramble for Arctic resources as more polar ice melts and uncovers more exploitable land more rapidly than ever.

Other items of interest: The first acid-monitoring buoy of three planned is now at sea off Seward, Alaska; a new film details Students on Ice (an international educational program covering both polar regions) in Canada's northern islands, while the Catlin survey on ice islands continued lately as Ice Bridge flights from Greenland and overhead satellites augmented sea ice studies of that and other expeditions to many northern land, sea and ice locations too numerous to list herein. New reports are now available about Arctic coastal

areas and the dire effects of global warming thereon. Other studies continue relative to CO_2, methane, sulfur, mercury and other compounds absorbed or emitted from northern peat lands, tundra, forests, lakes, rivers, seas and ice, as well as meteorology, paleohistory, auroras, fish catches, oil drilling/prospecting, population and Magnetic Pole migrations, increased Russian caviar exports, and virtually anything one can name relative to the polar regions and the many dynamic changes occurring there. ❑

MOKI:

As I sat down to the task of writing my "Due North" installment, a number of ideas for its theme bounced around inside my boreally-biased head. "What wisdom might I impart on my captive audience this time?" I wondered. "Should my missive include follow-up stories to my past Arcticles, or should it build upon my readers' edification, or would something humorous be more entertaining?" Tough choice. So rather than overburden my gray matter, I've decided to serve up all three — a la carte style. Some hors d'oeuvres of news (hot and cold), a more substantive entrée, and some fun for dessert. The drinks are on the collective you, though.

Appetizer (hot): Referencing back to "the dudes," as they refer to themselves, of "Paddle to Seattle" fame, whose trip along Alaska's Inside Passage was featured in our January issue, kayakers JJ Kelley and Josh Thomas followed through with their plan to "Travel India's great Mother River by any means possible," which incidentally turned out to be by foot, cycle rickshaw, rowboat, and a scooter that JJ says "roared with the death moans of a body about to expire from this earthly world."

The mission: To tell the story of the Ganges, or Ganga, the natural resource that is more than just a body of water, but also viewed as a god — a river so holy it has the power to remove sins, a river so polluted that it has been classified as the dirtiest on Earth, and a river under huge environmental threat, predicted to be dry in perhaps 200 years. JJ and Josh traveled the Ganga from her glacial emergence in the Himalayas, across the agricultural plains of the subcontinent, to her diffusion into the largest delta on Earth.

For anyone interested in reading about this latest journey (and associated misadventures), visit their highly amusing blog at: http://blog.dudesonmedia.com/ ✠

Appetizer (cold): Although not recent news, but interesting enough to mention, is the "Hair Club for Musk Oxen." Yes, you read that right. Fortunately for our *Ovibos moschatus* friends of the Far North — particularly the bulls — they are not experiencing recurring issues with balding per se. However, there is a rather clever invention being tested in the field called the Muskomb that could prove to be a windfall for the Inuvialuit people living in the western Canadian Arctic, who are looking to cash in on the ever increasing demand for qiviut, the highly prized and coveted undercoat wool the animals shed each spring. Developed by Sharon Katz, the Muskomb boards, to which a grid of plastic-coated screws is attached, are mounted to boulders and made available for wild musk oxen to rub against. The loosened qiviut is captured by the screws, and is later collected for processing; no muss no fuss. Sure beats hand-brushing the occasionally ornery beasts, even those in captivity. ✠

Now to the meat-'n-potatoes **Entrée:** As an annotation to the "The Evenki and the Critical Role of Their Shamans" article in this issue, while the term is derived from the Tungus-speaking Evenki people of Siberia, shamanism is often regarded as an archaic phenomenon, even as the origin of religion. Only rarely is the vocation taken up voluntarily. Shamanic practices included healing of the sick, control of hunted game, altering consciousness, journeying to other worlds, speaking to spirits or becoming possessed by them, even forming marriages and sexual relationships with powerful "spirit-helpers."

In doing research for the article, what I found most intriguing was the concept of the "third gender," which disrupts the Western conception of "male" and "female." Shamanic behavior necessitates a broadening of the notion of gender to be more fluid and dynamic. Bernard Saladin d'Anglure, a scholar on the topic, proposes a "ternary" model for Inuit shamans wherein shamans are "in between" persons (by persuasion or initiation) who embody a "third gender" due to their ability to mediate.

In Inuit culture, as well as in those of the Evenki and Buryats, children are understood to choose which gender to be before birth, their sex in utero adapting to their decision. Other children are given the name of a deceased relative of the opposite gender, adopting that gender identity for the time that they hold the name. These are closely guarded beliefs, however, and what information is available is complex and difficult to interpret. The tightly bound relationship between shamans and their other-world helpers implies that secrets are kept, and that revealing of secrets may lead to the withdrawal of assistance from a nonhuman helper, thus compromising the shaman's ability to shamanize. ✠

And now to the part of the meal you've all been eagerly awaiting: **Dessert** — a nice helping of "Out of the Mouths of Babes" pie a la mode (whipped cream optional). During my classroom polar presentations, I cover a number of subjects: Arctic fauna, atmospheric phenomena such as the aurora and ice haloes, stories about the indigenous peoples of the Far North, as well as polar exploration and science in general. I bring along numerous show-&-tell artifacts to illustrate my points. In return for my talks, I ask my students to write me letters with their thoughts or comments or questions. It never ceases to amaze me what I receive, some of the notes with accompanying illustrations. The following are excerpts from this past year's letters (misspellings left intact), each of which is priceless to me in its own way, as I suspect you'll agree:

- "I am wondering why penguins live on the South Pole and polar bears live on the North Pole? Can't they just share? Do they have to be just like politishens?"
- "What was also very interesting was the dogsun and how it creates an upsidedown rainbow. Shouldn't it be called a bowrain then?"
- "Thanks for the presentation. Someday I hope I'll go there too! If I do, I hope to see the aurora borialis and a sundog thingie. Wouldn't it be cool if we could go there on a field trip? I liked the coloring of the Inuit seal skin coat you showed us, but man did it stink!"
- "After I felt the polar bear's fur, I understood how bears survive there without catching a cold. Ahchoo!"
- "I learned that it takes a longer time to freeze salt water than fresh water, I also learned that it could get so cold up at the north pole that the air freezes and it looks like little crystals in the air. I also learned that there is such a thing as narwalls. I love science and you taught me so many things that I want to become a poler scientist now! You rock!"
- "I thought it is amazing what you do, I can't believe I standed in the same room with a person that's been to the North Pole!"
- "Although it would be a great experience, I wouldn't be able to survive out in the freezing whether without playing soccer on the ice or listening to music. I am more of a warm weather girl, so I'd rather stay home. To sum it up, the most important lesson I learned today was... always follow your dreams and you can accomplish anything."
- "Even though I havn't thought of being an explorer as my job for the future, but you changed my mind."
- "I enjoyed the experience of getting to know more about the North Pole. I've always

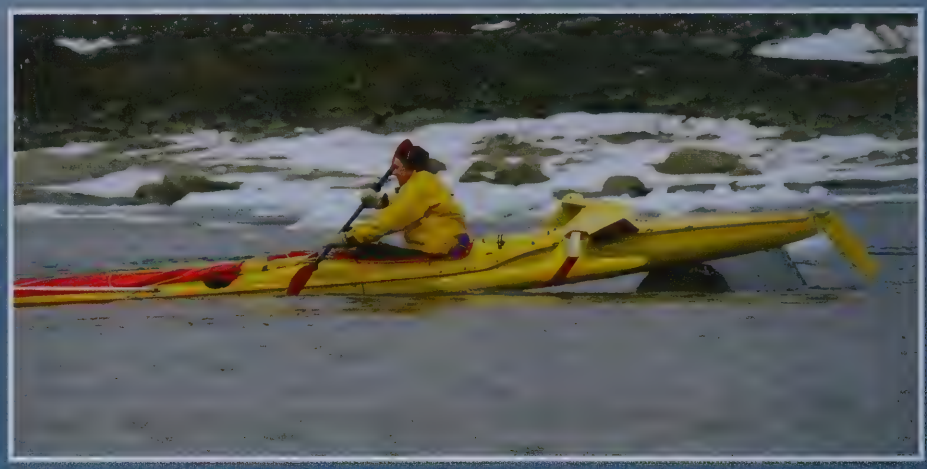
CONTINUED ON PAGE 26

Bowhead Whale Decides to Become Nosy . . .

This shot was taken while on expedition to gather content for photographer Flip Nicklin's memoir *Among Giants: A Life with Whales*, which was published in April 2011 by University of Chicago Press. For more about this book, please visit http://flipnicklin.com/2011/01/14/among-giants-a-life-with-whales/

Permission to use this image was generously granted by both Flip Nicklin himself and Minden Pictures, to both of whom we are most grateful.

Flip's brief biography from his own website [http://flipnicklin.com/about/]: "Widely regarded as the world's leading cetacean photographer, Flip Nicklin grew up around his father's small dive shop on the California coast. He went on to become National Geographic's premiere whale photographer and marine mammal specialist. Over the last quarter century, Flip has photographed more than thirty species of whales and dolphins, some so endangered their very survival is in question. In 2001, he co-founded Whale Trust, a non-profit organization dedicated to research and public education. For information, please visit www.whaletrust.org. ❑



Bowhead whale (Balaena mysticetus) noses the kayak of biologist Kerry Finley in Isabella Bay, Baffin Island, Canada. — Photo credit: © Flip Nicklin/Minden Pictures.

Due North — Continued from page 25

wondered how you would go to the bathroom there, and now I know. You probably don't even know who I am, but you will. I am the girl with the very short brown hair, in the skirt, who asked a lot of questions. Hopefully you remember me, but if not, who cares. I dribbled water on the paper I am currently writing on by accident. Anyway thanks a bunch for coming and giving me and my friends inspiration to reach our goals. Even before I met you I have had a dream of being a geneticist, one day I hope that will happen. One thing I hope will never happen is to be eaten by a polar bear. The bear would say "looks tasty" but I would not enjoy it. Bye."

◆ "Well, it was a good presentation with great facts, but now we people have to spread the word. Can you tell us what else we can do to help the planet?"

◆ "Thanks for putting such important information in my brain. I'll tell my family about you and what you taught me today. I learned that Eskimos prefer to be called Inuits. I won't call them Eskimos anymore."

◆ "Thank you for showing us your presentation. I really liked it, and I learned A LOT about the North Pole. You almost made me want to go to the North Pole. I said ALMOST!"

◆ "I didn't expect the slideshow to be so detailed. I thought it was going to be: I WENT TO THE NORTH POLE. THE END. But now I am sorry I didn't get your autograph; oops. I am adding a drawing on the other side of this paper. My artwork is terrible. P.S. It is not a lion; it's a polar bear. Sorry for your inconvenience."

Yes, dear readers – this is precisely why I do what I do. I never lose sight of the fact that somewhere, someday there will be new young explorers and "poler" scientists and better stewards of our planet who will have been inspired by me. Who'da thunk that a very stinky Inuit coat possessed such powers? ❑

Nansen's last dog, born on the Fram in 1893, died 30 miles north of Franz Josef Land in 1895.

George Wallerstein, FN '79, was raised in New York, graduated from Brown University and completed his Ph.D. at Caltech. He spent seven years on the faculty at Berkeley and is now Professor of Astronomy at the University of Washington. Wallerstein has participated in expeditions to Greenland, Ellesmere Island and K2.

Suggen — A poem by George Wallerstein, FN '79

Why do I pull in the harness?
Why do I sleep in the snow?
Why must I lead where no man has walked?
So few of us ever know.

Born on the wooden deck of my ship,
Locked in the frozen sea;
I never saw a tree or a rock,
Just my ship, my brothers, and Thee.

We played, my brothers and sisters and I,
In the long late winter and spring.
We thrived in the sun that year, on the ice,
And knew the joy it could bring.

We fought beneath the northern lights,
To show who ruled his peer.
Soon brothers and sisters, strangers and friends,
Knew I was the one to fear.

I knew I was the best of the team,
Though smaller than two or three.
I knew I'd lead the sledge in the spring,
To do Thy bidding for Thee.

When the sun returned we left for the North,
And our chance for a single deed.
Northward we drove over floes and ridges,
Past pans and brash-filled leads.

North 'til the sun circled over us,
As it had over none before.
North, 'til we stood and turned –
For the land known only by lore.

'Twas summer now and on through the slush
We pulled our lightening loads.
We knew how fast we had to go,
For hunger was marking our road.

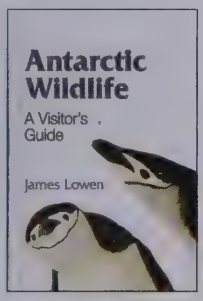
Fewer we were by one each day,
'Til finally You and me.
We made our camp on a lonely floe
Beside the open sea.

You had a kayak with just one seat;
You knew how to use it, too
You stowed your tent and food inside,
But what was I to do?

You've got your gun; is that a seal?
I think he's round this floe.
Come hurry, Boss, I'm hungry, too;
You've never walked so slow.

Why do I pull in the harness?
Why do I sleep in the snow?
Why must I lead where no man has walked?
So few of us never know. ❑

Book Reviews



Antarctic Wildlife: A Visitor's Guide

by James Lowen

ISBN13: 978-0-691-15033-8
$22.95, 240 pp., 5 x 8, 159 color photos

Reviewed by Charles H. Lagerbom

When wildlife writer and photographer James Lowen first went to the Antarctica Peninsula, he longed for a compact, portable book detailing the region's wildlife that would help him identify what he was seeing and suggest where he should look for it. He also wanted it to be a literary and visual reminder for him for when he was not in Antarctica. So upon his return, he wrote one. The result is *Antarctic Wildlife: A Visitor's Guide* produced by WILDGuides Ltd and published by Princeton Press. The book is specifically designed for cruise and expedition travelers to the Antarctic Peninsula by way of South America.

Lowen's goal was to produce an easy-to-use field book that would appeal to both newcomer and veteran Antarctic travelers, a guide to allow confident identifications of penguins, whales, seals, seabirds and other wildlife. He begins with an overview of the continental, oceanic and Antarctic environments the tourist will encounter during the voyage. He also pays close attention to conservation issues and action and provides a well-written outline of tourism with its opportunities and problems. Novices to Antarctic cruising will appreciate the section devoted to how an Antarctic cruise actually works as well as the helpful information on choosing the right kind of trip for a rewarding experience. He also discusses what to bring for wildlife watching and provides suggestions on how to specifically look for the wildlife. Being a photographer, Lowen also has a section on Antarctic wildlife photography.

While an engaging and well-illustrated introduction to Antarctic wildlife competently covers the three environments, what I appreciate are the numerous pointers on what to look for and where, tips on identifications, and even a month-by-month breakdown entitled *Timing: The Antarctic Season*. I also like that it covers the plants and animals of the Beagle Channel and the Drake Passage in addition to the Peninsula. There are charts that list the wildlife, their regular and scientific names, the page number of their photo and even highlights those species seen most regularly. Other charts use easily understood symbols to cross-reference particular wildlife with particular sites, islands and locations. The result is an excellent "heads-up" for travelers eager to see and photograph particular species. Another chart I found quite interesting was the International Union for the Conservation of Nature (IUCN) threat categories that defined and rated the threat for species of the regions being visited. A detailed and easy-to-understand guide to the species accounts introduces the main section of the book: the individual wildlife identification plates and information. I also like that these plates show the birds in flight, standing or in the water at just the right perspective from which a tourist would potentially view them. With an index of English and scientific names, good detailed maps, tons of photos and a heavy duty cover to withstand splashes of water while bouncing around in a Zodiac, James Lowen has written a great guide.

WILDGuides Ltd is a publishing company committed to supporting conservation. For more information contact (http://www.wildguides.co.uk/) or Princeton Press (http://press.princeton.edu/). ❑

Deep Future
The Next 10,000 Years of Life on Earth

by Curt Stager
Thomas Dunne Books St. Martins Press, March 2011

Reviewed by Cliff Bekkedahl

Leave it to a paleoecologist to offer a long look — but hey, somebody had to do it.

Much of what the author, an ecologist, climatologist and science writer, who teaches at Paul Smith's College in the Adirondacks, brings to us in this book is far beyond the horizon of our youngest reader or even their great, great grandchildren. It's all so far out that you have to ask, what does it add or subtract from the global warming debate?

First off, debating the existence of global warming is over or should be — it's here, now, and will be with humankind well into the almost unimaginably distant future. The evidence is indisputable. Full stop!

However, what mankind can do to ameliorate or modify the impact of global warming is still a valid topic for debate, and the long look presented in this book could help in framing the parameters of such a debate. It may be some time yet before the clanging cymbals of the loonies on each end of the global warming debate have been silenced and reasonable people can begin to fashion policies, employ technologies and channel resources to do something constructive to counterbalance man's extraordinary impact on the natural forces that govern the cycles of Earth's existence. It may be some time yet, but books like this and their authors are beginning to lay the groundwork for a worldwide understanding of the endless journey of planet Earth. This journey has never been smooth or predictable. All we really know is that since the Industrial Revolution man has disturbed the natural course of events with an unprecedented infusion of vaporized carbon into the atmosphere that has and will continue to alter the climate pole to pole, over and under the seas and all the continental land masses.

It's all about change. We are currently in an interglacial period and slowly moving towards the next ice age. This journey has been altered by man's introduction of great quantities of CO2 into the atmosphere, a process that will continue for several centuries to come, and the net effect is that the arrival of the next ice age will be delayed as warm temperatures persist and cooling is delayed. We're talking in time increments of tens of thousands of years. Should we be concerned? Well, yes, there is a moral dimension to man's involvement in global warming. And yes, there are some immediate short term (100 to 200 years out) issues that people will find disturbing or threatening to their way of life. Some things can be done to address these concerns. What things and who pays will be a source of lively debate for decades to come.

The author sets his stage by posing two cases: a low case in which man in the next 100 to 300 years or more pumps another 1,000 gigatons of carbon into the atmosphere (current quantity introduced is 300 gigatons), and a worst case scenario of 5,000 gigatons. (The latter scenario would mean earth's reserve of burnable carbon would be exhausted.) He then proceeds to correlate these cases with past glacial and interglacial periods in which the Earth's temperature, ocean's acidity and other measurable factors are arguably comparable. Ice core analysis provides a backward look for up to 800,000 years ago, and beyond that, deep sediment cores on land and under seas provide the evidence needed to make the comparisons. One such factor is ppm counts of CO_2 at various epochs. We now are at 357ppm and climbing, and our author postulates a count of 500-600 ppm for the 1,000 gigatons scenario and 1,900-2,000 ppm for the 5,000 gigatons case. That's a lot of stuff in the air stoking the hothouse burners. Whichever the case, the next ice age arbitrarily predicted to arrive in 50,000 years could be delayed as much as 80,000 years. The author offers a number of thoughts based on paleo-discipline comparisons of what might transpire during this delayed period before the on-set of the next glacial era.

As to "solutions," Stager offers few. He urges measures that would find our CO_2 concentration as close to the low end as possible — 1000 gigaton scenario. If we manage to do so, then changes such as the rising of sea levels, the melting of ice sheets and the warming of our northern latitudes would be gradual and offer man opportunities to mitigate the harmful effects and exploit upside occurrences. If reality becomes the 5000 gigaton case, then notions of recovery or a return to our good old days are beyond the pale. The clock is running, but man still has time to make a choice.

This is an important book, measured and well written, and I'm sure there will be more just like it that build on the evidence that the paleo-disciplines develop. Some of the numbers are breathtaking, and the sweep of time is mind-boggling; but the end effect is to provide the reader a perspective from which to understand global warming in the near term (within our children's children's lifetimes) and the great beyond of eons and epochs. The book is available in hard and soft cover and E-book. ❑

Below Freezing: The Antarctic Dive Guide

by Lisa Eareckson Trotter
2nd Edition WILDGuides Ltd, Old Basing (2008)
128 pages, softback
ISBN: 978-903657-28-7

and

A Field Guide to the Flora of South Georgia

by Deirdre Galbraith
WILDGuides Ltd, Old Basing (2011) 72 pages, softback
ISBN: 978-0-9564546-0-7

Reviewed by Charles H. Lagerbom

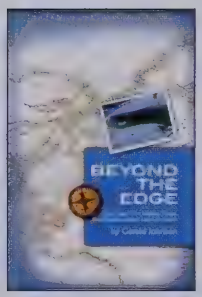
Lisa Eareckson Trotter's *Below Freezing: The Antarctic Dive Guide* is one of two recent publications from WILDGuides, a not-for-profit organization created in 2000 and committed to supporting wildlife conservation. Since their inception, WILDGuides has produced numerous field and visitor guides to areas of interest to our society members. Profits from the sale of their publications go toward supporting a range of conservation charities worldwide. I have some of their earlier publica-

tions such as Sally Poncet and Kim Grosbie's *A Visitor's Guide to South Georgia* (2005) as well as the second edition of Debbie Summers' *A Visitor's Guide to the Falkland Islands* (2005). These were reviewed in *The Polar Times* Addendum July 2006 Volume 3, Number 9. I also have Robin W. and Anne Woods' *Birds and Mammals of the Falkland Islands* (2006). All are first-class, highly illustrated, informative guides.

Trotter's dive guide, lavishly packed with colorful photographs of marine life, details 27 dive sites on the Antarctic Peninsula and South Georgia and is pretty much the first book of its kind. I particularly enjoyed the sections on underwater photography and the history of Antarctic diving. Trotter also provides tips on how to choose and prepare for a dive trip to the Antarctic. Anyone interested in slipping beneath the cold waters of Antarctica would be well served by this publication. As more and more sport and recreational divers focus attention on this region, books like this will be quite helpful. *Below Freezing* should go hand-in-hand with *Beneath Falkland Island Waters* by David Enyon (2010), which was reviewed in *The Polar Times* July 2010 Volume 3, Number 17.

South Georgia is an isolated sub-Antarctic island of mostly rock and ice, so one might think there would be little else of interest to see, especially regarding plant life. But the island's discoverer, Captain James Cook, knew better. And so does Deirdre Galbraith, who has put together a great field guide to the flora of South Georgia. Profusely illustrated and quite detailed in information, Galbraith's book details the history of botanical exploration on the island starting with Cook in January 1775, Joseph Hooker in the 1840s, the German IPY expedition in the 1880s to Stanley Green of FIDS in the early 1960s and recent flora studies conducted by the Kew Royal Botanic Gardens. She walks the reader through the various types of sub-Antarctic vegetation, their major habitats and the issue of invasive species. At only 72 pages, the author packs in a lot of good information, great color photographs and a useful reference section. Proceeds will help the South Georgia Heritage Trust.

For more information on WILDGuides: (http://www.wildguides.co.uk/component/content/article/93) ❑



Beyond the Edge
The Search for Ultima Thule, the Northernmost Land On Earth

by Gerald W. Johnson
Minneapolis: Bascom Hill, 2011, 109 pages, $39.95

Reviewed by John Splettstoesser

It is not unusual for humans to attempt to be the first to reach the North Pole, South Pole, or any other geographical feature of importance for political, territorial or other reasons. In this centennial year (2011-12) of the discovery of the South Pole, by Roald Amundsen on Dec. 14, 1911, and Captain R.F. Scott, on Jan 17, 1912, a large number of private expeditions were organized to re-live those events.

Similarly, it has been known for many years that Mount Howe in Antarctica is the southernmost land (rock outcrop) in the world, located at 87°22'S, 149°30'W, only some 160 nautical miles (300km) from the geographic South Pole at 90°S.

But what about the northernmost land in the world? In the Arctic, attempts to locate the northernmost land have revolved around Cape Morris Jesup and Kaffeklubben Island, the northernmost coast of Greenland, not necessarily to set records for "firsts," but also as a result of expeditions, surveys and related field work along that coast. Gerald Johnson, a veteran of the Arctic and retired Professor Emeritus of Civil Engineering at the University of Minnesota, has had a 40-year career in surveying, mapping and astro-navigation that has taken him to remote parts of the earth, including seven Arctic expeditions.

Robert Peary, who claimed to have reached the North Pole in 1909, figures frequently in this book because of his extensive exploration of the Arctic, particularly Greenland. In 1900, Peary sledged along the north coast of Greenland and declared a cape to be the northernmost land in the world, which he named Cape Morris Jesup. In a later expedition in the area in 1921, Lauge Koch discovered an island about a mile offshore from the cape and named it Koffeklubben Island, Danish for "Coffee Club" Island, the name reflecting the weekly coffee club gatherings he had attended at the University of Copenhagen. But that didn't end the matter, as later visitors in 1978 discovered a small island to the north of Kaffeklubben Island, which they named Oodaaq, named for one of the Thule sledge drivers who brought Peary to the North Pole in 1909. The author teases the reader when he brings in later expeditions to that coastal area when "ghost islands" are found north of Oodaaq, very low in relief and barely visible in the best of conditions.

The sequence of events in the discoveries, beginning with Peary in 1909 through 2003 to document "Euro-American Island," is given in Appendix B, along with coordinates for each island; a map on p. 92 locates them with respect to the north coast of Greenland. From Peary's Cape Morris Jesup in 1909 (83°38'N, 33°20.5'W) to "Euro-American Island" in 2003 (83°42'N, 30°33'W) is an apparent short walk, but a longer trek from there to the North Pole is a distance of about 380 nautical miles (700km). For the historians and adventurers, the matter might be settled, unless another "ghost island" appears in a later visit to the area.

Are the ghost islands barely above sea level a result of sea-ice pressure that brings up bottom sediments, thus subject to eternal changes in local conditions? Decide for yourself after reading the narrative. Seven color photos and numerous maps help to explain the geography and the individuals active in this adventure, including the author standing at the northern tip of Cape Morris Jesup in 1968. A two-page bibliography provides references to discoveries mentioned in the text. I recommend this book highly for those who are interested in polar exploration, discoveries, and the intrigue that is a part of the adventure. ❑

Who Reached the South Pole First?

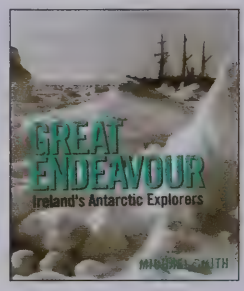
by Sheila Griffin Llanas
Mankato, Minnesota, Capstone Press, 2011, 32 pp, $19.75 hardbound; $7.95 softbound

Reviewed by John Splettstoesser

A centennial anniversary of the achievement of the South Pole by Roald Amundsen in December 1911 and Captain R.F. Scott in January 1912 has produced a number of books, articles and special events related to this historic event. Books for children are no exception, as it is a means to acquaint youngsters with some history they will hear occasionally throughout life.

This book is one example, with an audience for ages of about early elementary school students. The content was well researched, many photos are included from various photo archives, including actual scenes of Amundsen and Scott and their compatriots in a number of scenarios, such as the arrival at the South Pole by Amundsen, and a later arrival by a dejected Scott. Four chapters cover the entire tale. A timeline of events follows, plus a glossary, a list for further reading, Internet sites and an index.

The book is hardbound and durable for longevity with the anticipated handling and reading by younger folks. I recommend it for parents who read to their children to give them some idea of the hardships that were encountered toward the achievement 100 years ago of a remote part of Earth. ❑



Great Endeavour:
Ireland's Antarctic Explorers

by Michael Smith Cork
The Collins Press, 2010.
254 pages $52

Reviewed by Charles H. Lagerbom

Nations have long celebrated their native sons of polar exploration fame. Some of the first works at grouping them together were Teddy Evans' *British Polar Explorers* (1944) and *Great Norwegian Expeditions* (1950) by authors Thor Heyerdahl, Soren Richter and Hj. Riiser-Larsen. Within the last decade, Norway has produced even more works on their polar heroes including Kare Berg's *Norwegian Maritime Explorers* and *Expeditions: Over the Past Thousand Years* (2001) and Berg's *Heroes of the Polar Wastes: Pioneer Norwegian Explorers in the Arctic & the Antarctic* (2004) as well as *Into the Ice: The History of Norway and the Polar Regions* (2006) by Einar-Arne Drivenes and Harald Day Jolle. Canada and Germany have also enjoyed the polar exploits of their citizens with Dan Beeby's *In a Crystal Land: Canadian Explorers in Antarctica* (1994) and David Thomas Murphy's *German Exploration of the Polar World: A History, 1870-1940* (2002).

Michael Smith and The Collins Press have now given Ireland and her polar progeny a chance to shine. Great *Endeavour: Ireland's Antarctic Explorers* covers a range of notable Irishmen who experienced the seventh continent. The major players are dutifully represented, including Ernest Shackleton, Francis Crozier and Tom Crean, all subjects of individual biographies by Smith. Those famous three Irishmen had tremendous impact on the history and exploration of Antarctica, and Smith does them all justice.

But what I found even more interesting were the chapters devoted to those who might not be as widely known or celebrated as the big three. Edward Bransfield and his early 19th-century voyages, Patrick Keohane and Robert Forde of Scott's last expedition, and the brothers Mortimer and Timothy McCarthy of Shackleon's *Endurance* expedition all come to light and are given their proper due. Another interesting facet Smith examines was Ireland's independence and its implications and complications for many of these Irish members of famous British polar expeditions. Smith ends his two-hundred-year review with a look at 21st century polar personalities, including Mike Barry, Pat Falvey, Clare O'Leary and Mark Pollock.

Each chapter has a profusion of maps and photos and is an enjoyable read. There is a detailed bibliography and a good index in the back, and the book's pages are of high-quality paper stock. Michael Smith has done a wonderful job with this collection of Irish explorers and

adventurers in the Antarctic — and it is quite fitting that he chose to dedicate *Great Endeavour* to all of Ireland.

For more information, contact the author (http://www.micksmith.co.uk/index.asp) or The Collins Press (http://www.collinspress.ie/). ❑

Field Notes From a Catastrophe:
Man, Nature, and Climate Change

by Elizabeth Kolbert
Bloomsbury USA, New York, 2006

Reviewed by Herbert R. Drury

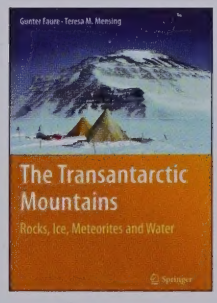
Despite being almost five years old, this book remains as timely as ever. It summarizes virtually all aspects of the climate change and global warming problem, giving both sides of the controversy so that readers can make their own decisions. The author has spent years researching the environmental aspects of both natural events and man's attempt to monitor them, as well as the political efforts to counter their effects, proven and predicted. She delves deep into a variety of scientific studies in numerous locations that seem to paint an obvious picture of changes in global weather and climate, past, present, and future. She then documents America's "official" responses to this apparently impending environmental disaster, along with those of other nations, for us to see if we care enough to possibly salvage our earthly future before it becomes too late. Our choice!

Why are we reviewing this volume in *The Polar Times*? Because much of the evidence, scientific and otherwise, comes from the high latitudes. Ice and permafrost are receding and melting at rates previously unknown to mankind, though such events have been shown to occur in the prehistoric past, but apparently not as rapidly as today. Many other activities or trends are revealed in this epic work in nearly every region of the earth. Changes not only in physical features are in progress, but also in chemical and biological realms worldwide. Just a few of the items expertly explained by this very knowledgeable author include both rapid and almost imperceptible variations, movements, declines, and growth in multiple subjects. Some of these include: increasing ocean acidity, atmospheric "greenhouse" gases, storms, droughts, forest fires, and rising sea levels, to name just a few. Declines: in sea and land ice cover, permafrost levels, available water, organisms of many species, and gradual to abrupt migrations of certain creatures from microbes to whales to humans have been discovered in many parts of the world from tropics to poles. Innumerable very compelling arguments for the existence of changing climates everywhere are thoroughly documented in this book.

And yet, despite all the accumulating and incontrovertible evidence, there are those who refuse to believe what is so very obvious, or to do anything about it. True, no one really knows what the "turning point" may be beyond which there might be no stopping extremely serious consequences of "business as usual" on the planet. But those who know about such things have been sounding alarms for years already, yet there continues to be resistance to meaningful endeavors to at least try slowing the processes, whether natural or man-made, that are looking increasingly catastrophic for mankind and the world in general. And America, the greatest polluter of all, continues to do little to help.

The unique ways this author presents her evidence and arguments, both for and against the idea of global warming and how to limit its effects, is what makes this interesting treatise so important and valuable to our understanding of this issue, still so poorly known by the masses, and unfortunately many politicians as well. She selects just a few of the numerous possible examples of change now becoming so evident to those willing to not only look but to observe and comprehend. Sadly, far too few of us have so far been doing this. The George W. Bush administration's lack of positive action, despite verbal agreements and efforts of many other countries to begin controlling or reducing greenhouse gas emissions, is discussed in upsetting detail. And the complicated, delicate balance between developed nations and those still in that process is outlined so that readers can easily determine why progress in attempting to slow down human contributions to the worsening problem has been so elusive.

Elizabeth Kolbert has done a splendid job of seeking out the impending dangers if we all continue to "hide our heads in the sand and hope for the best" as humanity pours ever increasing amounts of harmful gases into not only the earth's atmosphere, but also its land, waters, ice and vegetation everywhere. Hers is a sobering account of why governments worldwide need to cooperate in development of unified plans to save us from ourselves. We owe at least that much to our grandkids. ❑



The Transantarctic Mountains:
Rocks, Ice, Meteorites and Water

by Gunter Faure and Teresa M. Mensing
Springer, 2010, 804 pp, hardbound, $229.00

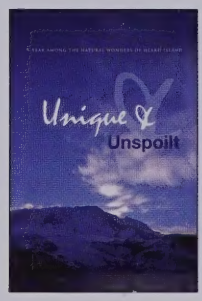
Reviewed by John Splettstoesser

Anyone who has worked in the Transantarctic Mountains (TAM), has an interest in it, or intends to work there in the future, will find this unique volume to be a handbook for the subject material. The four parts, covering more than 750 pages, include (I) Exploration and Characterization; (II) the Basement Rocks; (III) Gondwana: Growth and Distintegration; and (IV) Fire and Ice. Within those four parts are 19 chapters that cover an overview of exploration and details about the continent (topography, volcanoes, climate, ozone hole, U.S. stations), followed by geology of specific geographic areas (Victoria Land, Central Transantarctic Mountains, Queen Maud Mountains, Horlick Mountains, and eastern extensions of the TAM).

Discussions that follow are related to a succession of geologic events that include the widespread Beacon Supergroup rocks, intrusions of the Ferrar Group, and Gondwana breakup and uplift of the TAM. Cenozoic volcanism, East Antarctic ice sheet, and meteorite discoveries follow, with the history of glaciation of southern Victoria Land ending in Chapter 19. According to the rear cover blurb, "The subject matter is presented in chronological order starting about 750 million years ago and continuing to the present time."

The 330 line drawings and 182 color maps and photographs add to the text details. The authors have spent a combined total of 14 field seasons between 1964 and 1995 doing geologic research in this extensive mountain range and have published a considerable number of articles as a result. The book expands on their work and incorporates that of other investigators to provide a comprehensive and detailed review, as evidenced by a lengthy author index and separate subject index.

Antarctic exploration and geology has changed dramatically during a period of more than 175 years, from the time that the American geologist James Eights discovered the first fossil in Antarctica in 1830, to 1911 and 1912 when Roald Amundsen and Captain R.F. Scott reached the South Pole, each party collecting rocks on the way, to a period of reconnaissance geology during the period of the IGY, 1957-58, and the succeeding decades of detailed field work and mapping. The authors are to be commended for the considerable time it must have taken to compile the contents of this very useful book. It is evident that the financial and logistic support for those 14 field seasons have shown that the National Science Foundation and its Office of Polar Programs got its money's worth. Look for it in your local college or university library, or better yet, procure your personal copy. ❑



Unique and Unspoilt
A Year Among the Natural Wonders of Heard Island

by John Bechervaise
edited by Bernadette Hince,
National Library of Australia,
2011, 211 pp, AUD$34.95

Reviewed by Jeff Rubin

A volcanic dot lost in the vast Southern Ocean, Heard Island lies just 1,000km north of Antarctica and 4,000km southwest of Australia. Heard covers 390km2 and is 80 percent glaciated, although many of its glaciers are now retreating dramatically. The island's main feature is Big Ben, an active 2745m-high volcano that erupted in 1910, 1950, 1985 and 1992. From December 1947 to March 1955, Australia maintained a scientific base on Heard before personnel and material were transferred to Mawson Station in Antarctica.

Unique and Unspoilt covers John Béchervaise's 13 months in charge of the isolated station during 1953-54. Béchervaise was a determined diarist, sitting down late every evening to type up close to 1,000 words, after a long day of "cold, wind, work and sole responsibility for his 12 companions," as noted by historian Bernadette Hince, who edited his 550-page manuscript to approximately 170 pages. (Hince, who in 2000 wrote *The Antarctic Dictionary: a complete guide to Antarctic English* [see *The Polar Times*, Spring-Summer 2001], is currently writing a historical dictionary of Arctic English.)

Heard is a sub-Antarctic island, and its near-polar weather can be trying. Only when the nearly-incessant raging winds paused occasionally could the men experience relief from a "subconscious tension." In addition to snow blizzards, the men also had to put up with a strange local phenomenon: black blizzards that sandblasted faces, ears and other exposed parts with volcanic sand from the inexhaustible supply on the island's beaches.

The Heard Islanders spent their time counting wildlife, recording weather conditions, maintaining the station and training four dozen huskies, which were being bred and prepared for Antarctic work. When snow was scarce during the summer, the dogs were harnessed to

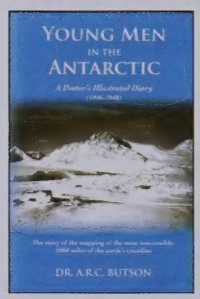
the "dogmobile," a rubber-tired cart built on an old Jeep frame, that careered around the station.

Like many polar expeditioners of that era, they ate the local wildlife, including penguins and seals. Unique, at least to this reviewer's knowledge, was their "poultry-raising": they penned up sheathbills to fatten them for the table. Perhaps ensuring that these birds could not indulge in their normal excrement diet also made them more palatable!

Yet the men also found time to appreciate Heard's beauty, particularly on the rare day when the sun shone and the wind dropped. "This place would take a lot to equal it for grandeur," Béchervaise recorded in December 1953, adding later that "when the time comes for the station to be relieved, each man must sever a thousand spiritual and physical threads."

The year's highlight, for Béchervaise, were the two attempts he made with companions Fred Elliott and Peter Shaw to climb Big Ben (or more properly, Mawson Peak at its summit). On the first, two of the trio were nearly overcome by carbon monoxide. On the second, they were trapped by weather in their camp at about 1,500m, spending 18 days on the mountain before being forced to retreat. There was hardly shame in their failure, however, for Big Ben was first climbed only in 1965 by a private Australian expedition. Since then, just two successful attempts have followed.

The book includes several maps and 21 color and black-and-white photographs, some of them by editor Hince, who visited Heard in 2002. ❑



Young Men in the Antarctic
A Doctor's Illustrated Diary (1946 – 1948)

by Dr. A.R.C. Butson
The Battered Silicon Dispatch Box, 2010, 340 pp, $30.00

Reviewed by John Splettstoesser

The subtitle on the title page aptly describes the contents very well – "The story of the mapping of the most inaccessible 1000 miles of the earth's coastline," a diary kept faithfully by "Doc" Butson, member of the Falkland Islands Dependencies Survey (FIDS) expedition at British Base E on Stonington Island, Marguerite Bay.

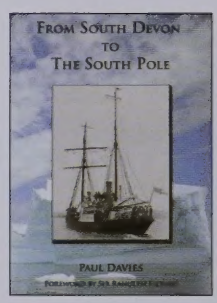
Butson sailed from England in 1946 as part of a British survey of the Antarctic Peninsula and, for 16 months, kept a daily diary of events, starting with the sail south, winter at Base E and surroundings on Stonington Island, and return to England. As the expedition doctor, Butson tended to medical issues with his colleagues as well as sledge dogs, plus spending time on the trail.

The detailed diary includes episodes of good times, celebrations, weather conditions ("filthy" in one instance), adventures with the rescue of a man from a crevasse, an airplane crash, and most anything else that can occur.

Base E had neighbors on Stonington Island, members of an American expedition under the leadership of Finn Ronne, who was a member of the U.S. Antarctic Services Expedition in 1939-41, also located on Stonington Island. Some of the cooperation — and also differences, personal and managerial — between the FIDS and Ronne expeditions are included in "Doc's" diary, making interesting reading, especially when compared to accounts by others. British experience in polar environments going back to the days of Scott is evident when reading the account on 11.11.47, p. 212-213. Butson states that the American pemmican *[a Native American survival food akin to the modern-day granola bar—ED]* is absolutely rotten. Having had a ration of it the previous night, Butson, Ronne and four others had nausea and regurgitation, and six also had diarrhea, for example. For anyone interested, the recipe for American pemmican is given on p. 213, but you can't say you weren't warned.

The diary is also replete with the wonders of this part of the world and of Butson's reaction to it, much as many others have experienced in an Antarctic adventure in places no one has ever been to. After leaving Base E and returning north, members stopped at Stanley, Falkland Islands, but not before a final snafu occurred — a bearing from another vessel for a heading to Stanley turned out to be reciprocal, so it meant following the wrong heading for four hours, and a reversed course was required. A stop at Stanley is appropriately mentioned with the words "We anchored in the harbour and put over the whaler and rowed ashore, making a beeline for the 'Globe' and the smell of ale." The famous Globe Hotel (and pub), an infamous presence in Stanley, provided a perfect arrival in civilization, complete with green grass and women.

Doc's diary is full of comments like that, making it very enjoyable to read. The diary ends on page 307 and is followed by photos and biographies of men from FIDS and also Ronne's expedition. Some 140 black-and-white photos are very useful in supplementing diary entries, including 20 in color. Sketch maps of the Peninsula and Marguerite Bay area are helpful in locating features mentioned in the diary. Privately published by George A. Vanderburgh, the book is available from the author, A.R.C. "Doc" Butson, 24 Auchmar Rd., Hamilton, Ontario L9C 1C5, Canada, for $30 plus $10 shipping and handling. The interesting life of Arthur Richard Cecil Butson is given in his c.v. on p. 336-340. Order a copy – it is unlike any other Antarctic diary. ❑



From South Devon to the South Pole

by Paul Davies
Forward by Sir Ranulph Fiennes. Devon: Kingsbridge Books and The University of Plymouth, 2011. 84pp Illus softback Limited to 500 copies £6.99

Reviewed by Charles H. Lagerbom

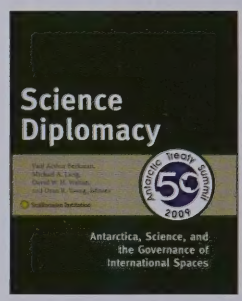
One of the great things about anniversaries and milestones is that, as they approach, they tend to prod interested parties into highlighting or focusing on the numerous local connections as part of the celebrations. Within the next year or so, Roald Amundsen and Robert F. Scott's centennial of reaching the geographic South Pole will be celebrated. Local places that played a role in these efforts are already gearing up for celebrations, both large and small. A most fortunate offshoot of all this, especially to polar book collectors, is the publication of local histories and their connections to the Heroic Age of Antarctic exploration 1901-1922.

Paul Davies of Kingsbridge Books in Devon has put together a wonderful book about the numerous connections between Plymouth (and its surrounding areas) and the five British expeditions made during the Heroic Age. In a very well illustrated and charming way, Davies walks the reader through the connections with each of the five expeditions beginning with Scott's *Discovery* venture and ending with Shackleton's *Endurance*. We are introduced to men from the area, including Scott himself but also to other less well-known figures from the expeditions, their mementos and memorabilia, memorials to them or about them, some of their grave sites, as well as other landmarks such as their houses of childhood, residence, work or retirement. It also has a forward by Sir Ranulph Fiennes, an introduction by Vice Chancellor Wendy Purcell of the University of Plymouth, a select bibliography, and a list of local institutions with present day connections to polar exploration.

In just 84 pages, Davies packs in a lot of great and interesting information. One comes away with a better understanding of the men of Devon, their roles in the expeditions and after, but also the role that Plymouth and the surrounding area played. This armchair tour makes one want to go there and poke around what sounds like a delightful place. Davies has shined a light on Plymouth and its environs, highlighting its great polar heritage of which they should be proud.

For more information contact (paul@kingsbridge-books.co.uk) ❑

Science Diplomacy:
Science, and the Governance of International Spaces



Edited by P.A. Berkman, M.A. Lang, D.W.H. Walton, and O.R. Young
Smithsonian Institution, 2011, 337 pp.

Reviewed by John Splettstoesser

This book is a product of keynote addresses, plenary presentations, panel discussions, workshops, and posters from the Antarctic Treaty Summit: Science-Policy Interactions in International Governance at the Smithsonian Institution during the period 30 November–3 December 2009. This golden anniversary celebration of the Antarctic Treaty of 1959 included participants from 27 nations and 40 national or international government agencies and others around the world. The dominant theme of the conference was science, which the Treaty of 1959 adopted when it was signed and designated the continent as a laboratory for science. The 33 chapters plus a conclusion chapter follow seven plenary sessions that include (1) Origin of the Antarctic Treaty; (2) Development of the Antarctic Treaty System; (3) Antarctica's Role in Global Science; (4) Science Advice in the Antarctic Treaty System; (5) International Cooperation in Antarctica; (6) Interactions Between the Antarctic Treaty System and Other International Regimes; and (7) Governing International Spaces: Lessons from Antarctica. Those plenary themes of the conference reflect the original Treaty intentions, assurance that what was agreed in 1959 has been effective for 50 years and will presumably continue. Details of a Forever Declaration and a concurrent resolution can be viewed at the website (http://www.atsummit50.aq), and a PDF can be downloaded of the book through www.scholarlpress.si.edu. Print copies are available on request by email: schol_press@si.edu. ❑

Letter from Membership Chair

Greetings from coastal Maine! I am excited to report that more and more of our members are taking advantage of renewing their membership through the PayPal feature on our website. This has been a savings for the society in terms of time and costs, so thank you to everyone who has used this feature. Rest assured, we will still continue to accept, process and renew memberships the more traditional way as well, so please choose whichever works best for you.

We are also trying to maintain an up-to-date email database for quicker communications with our membership, so thanks to all our members who have sent in, updated or passed along their most current email addresses to us. We do not plan to bombard anyone with tons of emails but, from time to time, might have a notice or message to pass along.

The society also appreciates those members who have actively recruited others who might be interested in joining our ranks. A big thank-you goes out to those recruiters! If you know of anyone who might be interested in American Polar Society membership, please pass their names and contact information along to us, and we will do the rest. Or you can buy them their first year's membership as a gift.

We also have society patches and pins available for purchase, so contact the Membership Center if interested. And thank you to those who have made donations to the society. They are greatly appreciated.

As I always say, the society's strength is in its membership. Thank you for your help in maintaining a stable membership, bringing in new members and actively spreading the word about the society! ❑

Charles Lagerbom
Membership Chair, APS

Changing of the Guard — Continued from page 2

something done, give it to a busy person!" His CV, like those of so many of our distinguished members, fills several pages. What follows is a brief bio that focuses on Andy's activities north and south of latitude 60°.

Andy Cameron has spent the past 30 years in technical exploration and support of scientific operations in remote and hazardous environments, including the Arctic, Antarctica (including winter-over at South Pole Station), open oceans, space, and extreme regions for the U.S. Navy, NASA, NOAA, NSF and the Russian Academy of Sciences. His experience includes 25 years as a NASA analyst and operations manager for Space Station, the Mission to Planet Earth, Moon/Mars programs, and interagency BMDO technologies, and participation in the Joint NASA-Soviet Space Working Group.

He is a long-term member of the Explorers Club and recipient of numerous international science and aviation awards, including the Antarctic Service Medal and the Aviation Week and Space Technology Award for Aviation Operations, among others.

He has recently completed support of a NASA Moon/Mars directive to develop the first NASA Lunar Habitat Prototype Demonstration now enduring a year's worth of extreme environment field-testing at McMurdo Station Antarctica. This was a new joint program between NASA, the National Science Foundation and ILC Dover Corporation.

Andy has worked with teams in search of the Franklin Expedition in the Canadian Arctic. During a Canadian Expedition to Marble Island investigating the 1719 James Knight Expedition, the team rediscovered the wrecked ship *Discovery* once sighted by Samuel Hearne in 1768.

Andy, thanks for joining us as we move APS further up the curve of relevance in polar matters. ❑

Dr. Polly Penhale Receives Ronne Memorial Award from The Explorers Club

The Ronne Memorial Award recognizes individuals whose accomplishments in polar field research best typify the spirit of explorer Finn Ronne. Its latet recipient, Dr. Polly Penhale, began her career as a marine biologist. In 1986, she moved to the National Science Foundation, where she became Program Manager for Polar Biology and Medicine, and has been involved in polar research ever since. She is currently Acting Head, NSF/OPP Office of Polar Environment, Health and Safety (PEHS). She has been the U.S. Representative to the Committee for Environmental Protection, Antarctic Treaty, and a member of the U.S. Delegation to the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR). Ronne Awards were initiated with Sir Wally Herbert, KBE (1985), followed by Monica Kristensen, Ph.D. (1991), William Steger (1998), Capt. William R. Anderson, USN (2002), Gerald L. Kooyman, Ph.D. (2007), and in 2011 for Polly Penhale. ❑

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About Our Back Cover

Hivshu, a wandering Greenland Inuit shaman and his drum performing a ritual. See related story on page 18. ❑ Photo © Galya Morrell

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